Beyond Vulnerability: Explaining State Intervention in Oil Supply in Asia-Pacific

A thesis submitted for the degree of Doctor of Philosophy of the Australian National University

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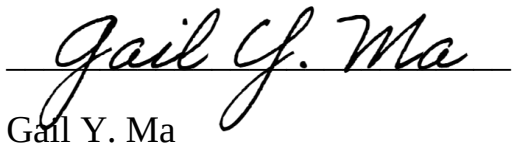
I certify that the thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.



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Abstract

The politics of oil will remain a central element of international economics and security for years to come despite the current falling prices. This is especially true in the Asia Pacific where oil self-sufficiency is the lowest among all regions of the world. This thesis develops a deductive vulnerability-interaction theory to answer two major research questions: (1) What explains variations in the levels of strategic oil supply measures adopted by Asian net oil importing economies between 1994 and 2013; and (2) what explains the adoption of a high level of such measures by at least some of those economies during this period? This study hypothesises that the actual level of strategic oil measures decision-makers would adopted at any given time is the result of the interaction among the economy's oil vulnerability (OV) and three key factors: (1) The level of decision-makers' trust that oil markets can ensure reliable and affordable oil supply to the economy; (2) the economy's overall implementation capability of strategic supply measures; and (3) the strength of private capital versus that of state capital in the economy. According to this reasoning, strategic oil supply measures would be higher if there is higher OV; or lower level of trust in oil markets; or higher overall implementation capability; or if private capital is stronger than state capital.

The vulnerability-interaction model develops here predicts the comparative levels of strategic oil supply measures adopted by two net oil importing economies at the same period or by the same economy in two distinct periods under two situations. It also specifies the results of the interaction of the explanatory variables in four cases. These include the two "extreme cases": (1) a net oil importing economy with a low OV, high trust, low capability, and high-strength private capital would adopt a low level of strategic oil supply measures or none at all; (2) one with a high OV, low trust, high capability, and low-strength private capital would adopt a high level of such measures. Short of these "extremes," the model further hypothesises two pathways for the adoption of a high level of strategic oil supply measures, the three-high type and the non-three-high type. This thesis conducts a preliminary assessment to test the vulnerability-interaction model with nine net oil importing economies in the Asia-Pacific, which establishes the model's validity. This initial evaluation's results also provide the basis for selecting two paired comparisons, India and Thailand and China and India, and one of the economies that adopted a high level of strategic oil supply measures, Taiwan, for more in-depth investigation. The study concludes that the vulnerability-interaction model compares well to the major alternative explanation of the adoption of interventionist oil supply measures – that of the Realist/geopolitical approach. Not having a high level of trust is found to be the most important *a priori* condition that causes net oil importing economies to adopt a high level of strategic oil supply measures.

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Chapter One
Interventionist Oil Supply Strategies in Asia-Pacific

In 2017 news headlines speculated about whether global oil prices would stabilise or slump further. Asian, and especially Chinese, national oil companies' (NOCs) overseas oil investments do not generate as much media attention as was previously the case. This does not mean that net oil importing states in the Asia-Pacific and elsewhere suddenly stop intervening in how oil is supplied to their economies all together. It does mean that due to lower oil prices, the rhetoric linking oil supplies to national and international security calculations has temporarily abated. History and economics, however, suggest that the current situation only means oil is experiencing a declining phase in what is historically an oscillating price cycle. Prices will eventually rise again unless sufficiently disruptive technological innovations emerge and are widely disseminated to alter longer-term patterns. The zero-sum worldview that is often promoted by those who "securitise oil supply" issues would likely return with a vengeance when and if oil prices rise again.

1. Discerning a Puzzle

Even the dominant academic literature on state intervention in oil supply has clustered around periods of high oil prices: between the mid-1970s and early 1980s, and again between 2008 and 2013.[1] The global "oil gut" that ended in the early 2000s prompted the establishment of an international oil pricing regime and the exchanges of this vital commodity that are more transparent and supply-and-demand driven than in previous eras. Over the past four decades, we have seen the exponential growth in the volume and sophistication in international oil trading.[2] The oil sectors in many advanced industrialised nations have also by and large been liberalised and deregulated.[3]

The Asia-Pacific has been consuming the biggest share of oil among all the regions in the world since around 2007.[4] Yet the pace of oil sector liberalisation appears to

[1] Llewelyn Hughes and Phillip Y. Lipscy, "The Politics of Energy," *Annual Review of Political Science* 16 (2013), 453.
[2] The trading volume of the Intercontinental Exchange, one of the three major international exchanges of oil, for example, grew more than 65 times between 1995 and 2016 alone. Data for the calculation is from "Historical Monthly Volumes – ICE Futures Europe," ICE Report Center. Accessed 2 March 2017, https://www.theice.com/marketdata/reports/7.
[3] Llewelyn Hughes, *Globalizing Oil: Firms and Oil Market Governance in France, Japan, and the United States* (Cambridge: Cambridge University Press, 2014).
[4] This is based on the data of various years of The *BP Statistical Review of World Energy*. If we adhere strictly to BP's definition of regions, "Asia Pacific" first surpassed "North America" as the region that consumed the biggest share of oil in the world in 2006 (29.5% versus 28.9% respectively). If we exclude Australia and New Zealand from the calculation as part of "Asia Pacific," the rest of the region surpassed the oil consumption share of North America around 2007. Both the Asia-Pacific-minus-Oceania region and North America consumed 28.7% of the world total that year.

be slower in the Asia-Pacific as a whole. However, there have been obvious variations in this region relative to how much the governments of individual net oil importing Asian economies have intervened in the oil supply to their respective economies. Besides, some economies appeared to adopt different levels of interventionist measures at different periods of time. This simultaneous existence of thriving international oil markets and continued but varying degrees of state intervention in the oil sectors present the puzzling phenomenon this thesis endeavours to understand and explain. As further discussed in the literature review section in Chapter Two, neither studies based on the neoliberal economic approach nor those on the Realist or geopolitical perspective satisfactorily explain these empirical observations.

The state or any government in fact is not so much an antithetical institution to the market as playing an instituting and maintenance role to it. In addition, the state can also make "affirmative use of market instrument," meaning changing the more "market-displacing" status quo to one more closely adhering to those commonly understood as free market principles. Strictly speaking, therefore, state intervention in oil supply may be concordant with letting the open international oil markets supply and the domestic market system distribute the oil needed in the economy in an unfettered manner. That is why the term used in the research questions generated by the puzzle discussed here is "strategic oil supply measures" instead, which excludes any affirmative use of market instruments by the state or the government.[5] Nonetheless, similar to many other studies on the politics of oil, this study often uses the term "state intervention" as a shorthand for market-displacing measures adopted by the state.

2. The Scope of this Study

The puzzling behaviour of the government of a net oil importing economies continuing to adopt varying levels of strategic oil supply measures simultaneously with fully-functioning oil markets, at least internationally, has not been confined to polities in the Asia-Pacific region.[6] The Asia-Pacific, however, appears to have a high concentration of

[5] For a detailed discussion of the concept of strategic oil supply measures, see Section Two in Chapter Two of this thesis. The term "affirmative use of market instrument" is used by G. John Ikenberry in "The Irony of State Strength: Comparative Responses to the Oil Shocks in the 1970s," *International Organization*, 40-1 (1986): 132. An example of such usage is in the article is the decontrol of oil prices in the United States in the early 1980s (132-133). The term "market-displacing" is used in Richard J. Samuels, The Business of the Japanese State: Energy Markets in Comparative and Historical Perspective (Ithaca: Cornell University Press, 1987), 13, 17.

[6] The United States, for example, maintains a strategic petroleum reserve that held the equivalent of about 137 days of oil it imported as of 2014. See "SPR Quick Facts and FAQs," U.S. Department of Energy website, accessed 1 August 2015, http://energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/spr-quick-facts-and-faqs. It also only lifted a four-decade ban on the export of oil and gas in December 2015. See "America Lifts its ban on oil exports," *The Economist*, December 18 2015. Accessed 11 November 2016, http://www.economist.com/news/finance-economics/21684531-light-sweet-compromise-puts-end-crude-market-distortions-america-lifts.

states that adopt various types and levels of such measures. China, India, and numerous other polities in the region, for example, have NOCs, even if these companies' standing in their respective economies' oil supply differs greatly. In addition, price control of some oil products was still common in the region as of 2013, the last year of the most recent price-rising cycle.[7]

More centrally, four of the world's top five crude oil importers have been countries in this region in recent years: China, India, Japan, and South Korea.[8] Since April 2015, China has overtaken the United States as the world's top crude oil importing country.[9] Nations that are not members of the Organisation of Economic Cooperation and Development (OECD) in Asia, most prominently China and India, will account for more than three-quarters of the net global increase in oil demand by 2030.[10] Indonesia, the fourth most populous country in the world, will also be integral to this exponential increase.[11] It switched from being the only member of the Organisation of Petroleum Export Countries (OPEC) in the Asia-Pacific to a net oil importer in 2004.[12] The emergence of heavyweight Asian energy consumers and related issues such as climate change and energy poverty, have begun and will continue to create seismic shifts in the energy policy agenda and governance pattern in the world.[13]

Exactly how this shift will unfold and what the implications are remain unclear. Due to the increasing oil self-sufficiency in the United States caused by the "shale revolution,"[14] and the either higher population or economic growth rates in major Asian

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[7] The Indian government, for example, only decontrolled the price of diesel at the end of 2014. The price of kerosene is still under control, but has been allowed to track more closely with pricing in the open market. See Saurabh Chaturvedi and Prasanta Sahu, "India Frees Diesel Prices From Government Control," *The Wall Street Journal*, 20 October 2014, accessed 15 August 2016, http://www.wsj.com/articles/india-frees-diesel-prices-from-government-control-1413648469 and "Govt allows oil companies to raise kerosene price by 25p/month," *The Indian Express* 13 July 2016. Accessed 1 March 2017, http://indianexpress.com/article/business/commodities/govt-allows-oil-companies-to-raise-kerosene-price-by-25pmonth-2911699/.

[8] "Country Comparison: Crude Oil – Imports," U.S. Central Intelligence Agency website, accessed 3 July 2016, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2243rank.html.

[9] Kevin McSpadden, "China Has Become the World's Biggest Crude Oil Importer for the First Time," *Time*, 10 May 2015. Accessed 4 February 2016, http://time.com/3853451/china-crude-oil-top-importer/.

[10] Mark Finley, "The Oil Market to 2030—Implications for Investment and Policy," *Economic of Energy & Environment Policy* (Vol. 1, No. 1) 2012: 29, http://www.bp.com/content/dam/bp/pdf/statistical-review/The_Oil_Market_2030.pdf.

[11] "Countries/Indonesia – Overview," The World Bank, last updated 22 September 2016. Accessed 1 March 2017, https://www.worldbank.org/en/country/indonesia/overview.

[12] Donald I. Hertzmark, "Pertamina – Indonesia's State-Owned Oil Company," Joint Baker Institute/Japan Petroleum Energy Center Policy Report (March 2007), 2-3.

[13] Andreas Goldthau, "From the State to the Market and Back: Policy Implications of Changing Energy Paradigms," *Global Policy*, 3:2 (May 2012), 198-210.

[14] "The U.S. Shale Revolution," University of Texas at Austin website. Accessed 1 March 2017, https://www.strausscenter.org/energy-and-security/the-u-s-shale-revolution.html.

countries, the centre of gravity of oil consumption politics is re-orienting from the United States and Europe toward Asia in the 21st century. This shift continues in spite of the falling oil prices in the last two to three years as oil producing countries have been even more eager to maintain their market shares in this region with still growing, if slowing, demands.[15] The unusual month-long tour of the Saudi King in the Asia-Pacific in early 2017 is emblematic of this continuing shift.[16]

The temporal scope of this study (1994 to 2013) is determined by two key factors. First, although spot trading in crude oil began in the early 1980s, it took almost a decade for it to become really widespread or in one commentator's word, "truly viable."[17] Second, these two decades saw big swings in oil prices from the low of US$12.21 to the high of US$109.08 per barrel at the dollar value of 2013.[18] This provides the opportunity to observe any impact oil prices may have on the levels of strategic oil supply measures adopted by net oil importing economies over time.

3. Research Questions

With the geographic and temporal scope of this study designated, the following two major research questions of this thesis can be identified:

(1) What explains variations in the levels of strategic oil supply measures adopted by Asian net oil importing economies between 1994 and 2013; and

(2) What explains the adoption of a high level of such measures by at least some of these economies during this period?

Quantitative researchers who engage in regression analysis may query the validity of designating a geographic scope that exhibits a concentration of the presence of the dependent variable (DV) of the research questions: adoption of strategic oil supply measures

[15] Of the major net oil importing regions of the world, only the Asia-Pacific maintained slight increases in both crude oil and oil product imports as percentages of the global total from 2014 to 2015. The U.S. imported over 2% less crude and its product import remained the same over the same period; Europe's crude import increased about 1% while its product import dropped very slightly. Data of the calculation is from *BP Statistical Review of World Energy June* 2016, 19. BP website, accessed 1 December 2016, https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf.

[16] For an analysis of the implications of the tour, see Ankit Panda, "What King Salman seeks in Asia," Al Jazeera website, 1 March 2017. Accessed 12 March 2017, http://www.aljazeera.com/indepth/opinion/2017/02/saudi-king-salman-seeks-asia-170228095334605.html.

[17] Izabella Kaminska, "The Decline of the Oil Spot Market?" FT Alphaville, 24 April 2013, accessed 2 July 2014, http://ftalphaville.ft.com/2013/04/24/1469422/the-decline-of-the-oil-spot-market/.

[18] *BP Statistical Review of World Energy June 2014*, 15. The prices quoted are for Dubai dated, the major reference crude for physical deliveries to Asia refineries.

by net oil importing states.[19] I respond by clarifying that although this study endorses the view that a generalised theory to explain interventionist measures in the oil sectors adopted by the government of net oil importing economies will eventually materialise, a case-oriented approach is privileged here. In addition, the first research question already presumes that the DV encompasses a range of possibilities among the cases. Yet, it does not assign bias towards any particular level.

The deductive model put forward in this thesis to answer these research questions is based on set-theoretic methods and logic in social science, not on probability or regression analysis.[20] For research that is predicated on such tools as set theoretic methods or process-tracing, selecting cases on the DV is not only acceptable, but is in fact expected.[21]

4. Answering the Puzzle

The vulnerability-interaction model posits that net oil importing economies are motivated to adopt strategic oil supply measures because they have a noticeable level of oil vulnerability (OV). The actual level of these measures that any such economy adopts at any given time, however, is the result of the interaction of three intervening factors: (1) its decision-makers' trust in the oil markets; (2) the overall implementation capability of the economy; and (3) the overall strength of private capital in the economy during the same period. The levels of all the variables of the model may change both across economies and over time.

This model further hypothesises that if all other things remain equal, the DV would be higher if: (1) there is higher OV; or (2) a lower level of trust that oil markets can provide adequate, reliable, and affordable supply of oil to the economy; or (3) a higher overall capability to implement the measures; or (4) private capital overall is stronger than state/government capital in the economy.

The vulnerability-interaction model specifies four pathways that would lead to the adoption of specific levels of strategic oil supply measures upon interaction of specific levels of the four explanatory variables at this stage:

(1) Low OV, high trust, low capability, and high-strength private capital would lead to the adoption of a low level of strategic oil supply measures (low DV);

(2) High OV, low trust, high capability, and low-strength private capital would lead to the adoption of a high level of such measures (high DV);

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[19] This objection has been raised by a number of IPE and IR methodologists. See for example, Gary King, Robert O. Keohane, and Sidney Verba, *Designing Social Inquiry* (Princeton, NJ: Princeton University Press, 1994), 129-132.

[20] For a discussion of the difference between these two very different approaches, see Gary Goertz and James Mahoney, *A Tale of Two Cultures: Qualitative and Quantitative Research in the Social Sciences* (Princeton: Princeton University Press, 2012), Chapter 1 - Introduction, Kindle edition.

[21] Ibid., Chapter 14 – Case Selection and Hypothesis Testing.

(3) High OV, medium trust, high capability, and high-strength private capital would lead to the adoption of a high level of such measures (high DV); and

(4) Noticeable OV, NOT high trust, high capability, and NOT high-strength private capital would also lead to the adoption of a high level of such measures (high DV).

5. The Study's Roadmap

Chapter Two of this thesis details the reasoning and formulation processes underlying the vulnerability-interaction model, explains the niche it occupies among existing literature in the politics of oil consumption, and maps out the empirical strategy to test the model. Chapter Three presents a plausibility probe of the entire model because it has not been tested elsewhere. This preliminary study establishes the validity of various dimensions of the model and provides initial results for the selection of appropriate cases for more in-depth case-study investigation of the model in Chapters Four and Five. These preliminary results support the validity of the vulnerability-interaction model. It compares well overall to the major alternative explanation of the adoption of interventionist oil supply measures – that of the Realist/geopolitical approach. Chapter Four compares the cases of India and Thailand and China and India with 2013 data; Chapter Five examines Taiwan's path to the adoption of a high level of strategic oil supply measures. Chapter Six concludes with a brief assessment of the vulnerability-interaction model's overall validity and theoretical insights gleaned from the empirical data used to test and refine the model.

6. Contributions

This thesis makes both theoretical and empirical contributions to the study of the politics of oil consumption, and the two types of contributions reinforce each other. First, it puts forward a model to explain why Asian net oil importing polities as a whole continued to adopt strategic oil supply measures in two recent decades while simultaneously using the markets to supply oil to their economies to different degrees. It also hypothesises the combinations of factors that would result in the adoption of a high level of these measures, the most puzzling behaviour against the backdrop of thriving international trade of oil.

Second, state mandated, administered, or funded oil supply measures across the whole region have rarely been systematically examined, and so have not been adequately theorised. Existing theories that underpin studies on the international politics of oil tend to be structural or economic in nature. Decisions to adopt strategic oil supply measures by net importing states involve complex domestic and external economic and political considerations, and have not been well explained by sweeping grand theories. The vulnerability-interaction model provides an initial but more specific framework to

understand actual events and their implications. The typologies developed in this study can potentially expand the model's applicability to a larger scope with further research.

Finally, the data gathered in the nine-economy plausibility probe add breadth to the knowledge in strategic oil supply measures adopted by net oil importing economies in the region, and in major factors that would lead to their adoption. Two important strategic oil supply measures are used to uniformly gauge the DV of all nine economies. This facilitates meaningful comparison and interpretation, and contributes to the systematic accumulation of empirical evidence of state actions related to oil supply. China has been the focus of attention of studies on state intervention in oil supply in the last decade. India, Japan, and South Korea have made "occasional appearances," but not much has been known about the oil supply measures of other major Asian net importing polities and how they have evolved over time. A model that examines the facts as they were, not what they should have been, across the region is the first step in providing solid policy recommendations in subjects ranging from oil sector governance, climate change mitigation, poverty alleviation and economic development, as well as traditional security politics in the Asia-Pacific and beyond.

Chapter Two
Theorising State Intervention in Oil Supply

Some net oil importing states continue to play a relatively large role in the oil supply of their economies despite the increasing sophistication and trading volume in the international oil markets and the general global trend of oil market deregulation and liberalisation over the last three decades. Indeed, the level and nature of state intervention appear to vary both across economies and over time. This chapter develops a model to answer the two major research questions of this thesis, derived from the apparent puzzle posed by these trends: (1) What explains variations in the levels of strategic oil supply measures adopted by Asian net oil importing economies between 1994 and 2013; and (2) what explains the adoption of a high level of such measures by at least some of those economies during this period?

In the rest of the chapter, I will first explain the set-theoretic methods that underpin the deductive reasoning of the vulnerability-interaction model. I will then explicate the concepts and rationales behind strategic oil supply measures - the dependent variable (DV) of the proposed model, - and those of the explanatory variables. I then formally state the causal relationships among the variables and the hypotheses generated by the model. I also review the literature on oil importing states' intervention in oil supply and pinpoint how this study relates to the existing literature. The chapter concludes by setting out an empirical strategy used to examine the validity of the hypotheses generated from the proposed model.

1. Necessary, Sufficient, and INUS Causes

The vulnerability-interaction model advanced in this study is formulated according to the qualitative logic behind set-theoretic methods, and with the help of typological techniques.[1] As shown in subsequent chapters, however, many, but not all, the data used to substantiate the claims of the model and the tools used to analyse them is quantitative.

In set-theoretic methods of social sciences, a necessary cause or condition is one that must be present when an outcome is present.[2] An example of this is not having the

[1] For a brief comparison between the causal models based on the frequentist logic and on set-theoretic ideas, see Gary Goertz and James Mahoney, *A Tale of Two Cultures – Qualitative and Quantitative Research in the Social Sciences* (Princeton: Princeton University Press, 2012), 55 – 60. For an introduction to explanatory typological techniques employed in this project, see Colin Elman "Explanatory Typologies in Qualitative Studies of International Politics," *International Organization* 59 (2005): 293-326.

[2] Carsten Q. Schneider and Claudius Wagemann, *Set-Theoretic Methods for Social Sciences* (Cambridge: Cambridge University Press, 2012), 3.2.1.1, Kindle Edition.

citizenship of a state is a necessary condition for being deported from it. A sufficient cause or condition is one that is enough to cause the outcome (Y), but is not necessarily present when Y is present. This is due to *equifinality*, meaning the existence of "many alternative causal paths to the same outcome."[3] An example of a sufficient cause for being sentenced to imprisonment is being convicted for robbing a bank. People serve time in prison for a myriad of other causes, and robbing a bank is one of them.

Few, if any, social phenomena can be fully explained by either a necessary or sufficient cause alone. Therefore, methodologists have derived at least two more types of set theoretic causes that are more often used in social science research.[4] The one applied in this thesis is the INUS cause. 'INUS' is an acronym derived from a quote by J.L. Mackie that explains the term as "an *i*nsufficient but *n*ecessary part of a condition which is itself *u*nnecessary but *s*ufficient for the result."[5] James Mahoney gave the following example of an INUS cause:[6]

> A building can burn down (Y_1) either because of a short circuit (A_1) combined with wooden framing (B_1) or because of a gasoline can (C_1) combined with a furnace (D_1).

In this example, Y_1 can be caused by either A_1 and B_1 or C_1 and D_1. Each group is an INUS cause of Y_1 as neither A_1 nor B_1 can sufficiently cause a building to burn down by itself, but both must be present (necessary) to do so. At the same time, either group is sufficient but not necessary to cause the outcome.

2. Strategic Oil Supply Measures

The level of strategic oil supply measures adopted is the DV of the vulnerability-interaction model proposed in this thesis. These measures are defined as those mandated, administered, or funded by the government that may have a *direct* effect on the oil supply to the economy. They may include state-to-state and state-to-other-entity military, political, diplomatic, as well as economic policies. Opaque arrangements made between the Chinese state or companies owned by or closely connected with the state and major oil producing or transiting nations or their national oil companies NOCs under the auspice of the "One Belt, One Road" initiative [一带一路] are examples of strategic oil supply measures.[7]

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[3] Alexander George and Andrew Bennett, *Case Studies and Theory Development in the Social Sciences* (Cambridge, Mass: MIT Press, 2005), 9.
[4] James Mahoney, "Toward a Unified Theory of Causality," *Comparative Political Studies* 42:4/5 (2008), 417-418.
[5] Ibid., 418.
[6] Ibid.
[7] For an example of such arrangements, see Elena Mazneva, Stephen Bierman, and Javier Blas, "China Deepens Oil Ties With Russia in $9 Billion Rosneft Deal," *Bloomberg Market*, last updated September 8, 2017, https://www.bloomberg.com/news/articles/2017-09-08/china-s-cefc-buys-stake-in-rosneft-from-glencore-and-qatar.

The concept of strategic oil supply measures is inextricably linked with the role of the government in the economy, particularly within the oil sector of net oil importing economies. Therefore, understanding what those roles are is a pre-requisite to understanding what is counted as such a measure in this study.

After the end of the Cold War, almost all polities in the world have a mixed economy. A "mixed economy" is defined in this study as one that has "both a private and a public sector, linked through the operation of markets."[8] This means the state does play some role in the provision of goods and services in most economies.[9] Four major roles of the state are conceptualised in this study, in ascending levels of direct involvement in a sector or industry concerned: facilitator, regulator, investor, and direct provider.[10]

Using the oil sector and oil supply as an example, all net oil importing states facilitate oil supply to their economies by setting up a legal framework and by enforcing signed contracts between parties. Many others also build transportation infrastructure for oil and oil products to be moved around the country. Tax incentives to stimulate investments in the oil sector are also considered manifesting the facilitative, not the regulatory, role of the state because these incentives ultimately rely on the willingness of private firms to achieve the goals. As regulators, some governments, such as South Korea, mandate the minimum amount of oil stock private or public oil firms operating in their economies must have. Others, such as China, stipulate which companies are authorised to import crude oil and oil products. Environmental laws that may cause an increase or decrease in oil production in importing economies that still have indigenous resources are not considered in this study. This is because these laws usually have only second-order and indirect effects on oil supply.

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[8] Michael T. Peddle, *Does Government Need to Be Involved in Primary and Secondary Education: Evaluating Policy Options Using Market Role Assessment* (New York: Garland Publishing, 2000), 8.

[9] The most common example, as Peddle suggests (ibid.) is primary and secondary education. This may be understood as "merit goods" which are provided by both the government and the private sectors in most economies. For discussions on the definition, rationales, and impact of public provision of merit goods, see Riccardo Fiorito and Tryphon Kollintzas, "Public goods, merit goods, and the relation between private and government consumption," *European Economic Review* 48 (2004), 1367-1398; John G. Head, "On Merit Goods," *FinanzArchiv*, New Series, Bd. 25, H. 1 (1966), 1-29; and see James M. Poterba, "Government Intervention in Markets for Education and Health Care: How and Why?" in *Individual and Social Responsibility: Child Care, Education, Medical Care, and Long-Term Care in America*, ed. Victor R. Fuchs (Chicago: University of Chicago Press, 1994), 285.

[10] Peddle (ibid.) suggests three major functions of the government in a mixed economy: establishment and enforcement of a legal framework; adjust market outcome for collective notion of fairness; and mitigate market failures. John Zsyman suggests the three roles of the state in economic policymaking as regulator, administrator, and player. See *Government, Markets, and Growth: Financial Systems and the Politics Industrial Change* (Ithaca: Cornell University Press, 1983), 75-78. Ikenberry uses the facilitator, negotiator, and producer roles of the state to describe what he sees as increasingly interventionist energy adjustment strategies of the United States, Japan/Germany, and France respectively during the oil crises of the 1970s (The "Irony" of State Strength," 112). The four roles in this study are adapted from all these works.

As investors, some governments fund, own shares, or oversee NOCs with a mandate to produce or acquire oil for their economies, including many in the Asia-Pacific. Some sovereign wealth funds, including those operating in China and Singapore, also invest in oil and other energy firms or projects. The mandate and mechanism to supply the oil produced from these funds to the home countries, however, is unclear in many cases and so their participation is not counted as a strategic supply measure in this study. As direct providers, government ministries, occasionally sign contracts with counterparts in oil exporting states to supply oil to their economies directly. Some governments also administer strategic petroleum reserves (SPRs) either directly through a government agency or through their NOCs. The vulnerability-interaction model only takes into consideration the regulator, investor, and direct provider roles, but not the facilitator role of the state in evaluating its degree of intervention in the oil sector. This last role only has an indirect and diffuse impact on the economy's oil supply. Besides, even economies most observers would consider as adhering to free-market principles to a very high degree play the role of the facilitator.

The basic unit of analysis of this study is the state, personified by national level decision-makers in net oil importing economies. The national governments of net oil importing economies are seen as occupying a position in the international economic system that would generate similar preferences on how to realise the major goal of their oil policies: ensuring oil supply security, which is perceived to be vital to the wellbeing and survival of the economy. The different roles played by the state, however, also bring forth other actors that may also have a direct impact on national oil policies and the different levels of analysis of this study. Analysing a state's regulator role involves examining state-to-firm interactions, and these interactions would only be domestic.

The investor role of the state also involves state to firm interaction. The state has a principal-agent relationship with publicly-owned and/or administered firms, which are competitors of private oil firms. When NOCs engage in oil projects, they may interact with domestic and overseas public entities, private firms, and foreign governments. Therefore, these interactions can be both domestic and international in nature. This is especially true if the NOC(s) pursue exploration and production or other oil related projects overseas. Moreover, when the state acts as a direct provider of oil, it would have both state- to-state and state-to-firm interactions. Last, but not least, all these actors have to interact with the diffuse, uncoordinated, yet powerful transnational forces of the international oil markets.

The relationship between the state and its NOC(s) is the subject of a number of studies in recent years due partly to the increasing prominence of some NOCs internationally. These studies mostly adopt a principal-agent framework to understand this relationship and highlight the simultaneous mutual support and tension between the two, as well as their sometimes divergent motivations. In short, the state and its NOCs are treated as separate

units of analysis. While acknowledging the valuable insights provided by these studies, this thesis treats oil supply-related actions by both the state and its NOCs as strategic oil supply measures. After all, the state is the principal actor and it ultimately decides to keep the agent (in this instance, NOCs) and the proportion of control over it, instead of letting the private sector freely handle the supply of this particular commodity. A key objective of this study is to investigate what causes this outcome as manifested by the actual level of these actions (strategic oil supply measures) taken by both principals and agents.

A related point about government roles in the provision of goods and services is that the state and the market are not necessarily diametrically opposing concepts. To begin with, the state is understood as the institutor and maintainer of any domestic market. Even "international markets" abide by the rules and regulations, if not norms, in countries where they are physically located.[11] How "market-oriented" a particular strategic oil supply measure is has to be judged by the extent to which it permits, distorts, or promotes the functioning of a pricing mechanism based on demand and supply, and open and fair competition. Richard J. Samuels, for example, labels the two major categories of state intervention in the energy sectors as "market-displacing" and "market-conforming."[12] The former obviously is less "market-oriented" or more distorting than the latter. As further discussed in subsequent chapters, strategic oil supply measures creating varying degrees of market distortion are taken into consideration in this project.

To sum up, the proposed vulnerability-interaction model tries to explain variations of the levels of measures adopted by net oil importing states that have a direct impact on their economies' oil supply, especially in the Asia Pacific, over the last two decades. It also hypothesises pathways that would lead to the adoption of a high level of such measures. It does not, however, try to evaluate the effectiveness of these measures in achieving oil supply security. That said, this study does make the assumption that a price mechanism that is based on supply and demand fundamentals and free and open markets for oil, both domestic and international, would on average achieve the best economic efficiency, especially over the long run.[13] Otherwise, the puzzle of this thesis would not be puzzling any more.

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[11] This is at least the Polanyian understanding of the market. For a discussion of the Polanyian and the very different Schumpeteran understanding of what the market is and a synthesised understanding of the two, see Harvey and Metcalf, "The Ordering of Change: Polanyi, Schumpeter and the Nature of The Market Mechanism," *CRIC Discussion Paper 70*, March 2005.

[12] *The Business of the Japanese State*, 13.

[13] Even if such a pricing mechanism may not exist perfectly in the real world yet. For a critique of the current "market-related" pricing regime in the international oil markets and how it appears to be still some way from this ideal, see Robert Mabro, "The International Oil Price Regime – Origins, Rationale and Assessment," *The Journal of Energy Literature*, Volume XI, No. 1 (June 2005): 3-20.

3. Explanatory Variables

The vulnerability-interaction model has two layers, each targeting one research question in this project. The first is designed to answer the first research question, which seeks to explain the variations in the levels of strategic oil supply measures adopted in different net oil importing economies and the same economy at different periods. The second layer tries to understand the major causes for some net oil importing economies to adopt a high level of these measures.

The model specifies four explanatory variables: 1) oil vulnerability (OV); 2) the level of decision-makers' trust that oil markets can supply reliable and affordable oil to the economy; 3) the economy's overall implementation capability of strategic supply measures; and 4) the overall strength of private capital versus that of state capital in the economy. These variables are initially chosen through observations of measures adopted by various net oil importing economies as well as through deductive reasoning.

OV is conceptualised as the variable that initiates the desire to adopt strategic supply measures and therefore is the independent variable (IV) of the model. The *actual* level of strategic oil supply measures adopted or not adopted - the DV of the model under consideration here - would be the result of the interaction among these four factors. No hierarchy of importance of the four explanatory variables is assigned in the first layer of the model as it tries to explain the adoption of *different* levels of the DV. As detailed in Section 4 below, the model specifies the results of the interaction of these variables in four cases by applying set theoretic methods and typologising techniques.

In the second layer of the model, not having a high level of trust in the oil market and having a high implementation capability are initially theorised as *a priori* conditions to adopting a high level of strategic oil supply measures. In this sense, these two explanatory variables at the level specified are privileged as being more important in causing the adoption of a high level of strategic oil supply measures than the other two variables. As detailed in the concluding chapter, after the testing of the model with empirical data presented in this thesis, trust in the oil market appears to have a greater impact than implementation capability on the adoption of strategic oil supply measures, especially at a high level.

The rest of this section explains these four explanatory variables in greater details one by one, justifies their selection over other possible contenders, and specifies their theorised relationships with the adoption of strategic oil measures. Factors affecting the level of strategic oil supply measures adopted by net oil importing economies other than the four advanced by the vulnerability-interaction model likely exist. The proposed model only argues that the hypothesised explanatory variables are among the most important sufficient

and necessary causes to the DV and they provide a systematic framework to understand this study's designated research questions.[14]

3.1 Oil Vulnerability

The vulnerability-interaction model conceptualises OV as a sufficient but not necessary condition that *motivates* the desire to adopt or continuing to adopt strategic oil supply measures.[15] This does not mean that OV by itself is a sufficient cause for the *actual* adoption of such measures. It is argued here that the desire to adopt these measures is conditioned by the three major factors listed in the previous sub-section. If all other factors remain equal, the proposed model hypothesized that the higher a net oil importing's economy's OV is, the greater its desire to adopt strategic oil supply measures would be.

What constitutes OV and what is the reasoning behind such a conceptualisation? In line with this study's focus on measures adopted by the state to ensure oil supply security, OV is used in this model to mean 'oil supply vulnerability.'[16] Parallel to the two key components of oil supply security, physical availability and affordability, the components of OV formulated in this model are supply risks and market risks. "Supply risks" mean the likelihood that a country's oil supply would not be physically available at any given time. "Market risks" mean the likelihood that the prices and the costs associated with oil imports become unaffordable to an economy.

Details of how OV is operationalised and measured will be provided in later chapters. It suffices to note here that since market risk is only one of the two components of OV, the fact that all economies in the same region pay more or less the same per barrel price for imported crude does not mean all have the same OV during the same period. For instance, different geographical locations, even within the same region, may cause noticeable differences in the risk of interruption of physical supply of oil over a relatively short period of time.[17] Besides, the same price in absolute terms is not the same cost to all economies. There is a large body of literature that endeavours to measure OV, most encompass the concepts of the two types of risks adopted in this study even if the terminologies used may not be exactly the same.[18]

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[14] For a discussion of the trivialness of sufficient and necessary causes, see Goertz and Mahoney, *A Tale of Two Cultures.* ("Assessing Importance: Coverage and Trivialness" Kindle version).
[15] It is sufficient, but not necessary because some states, for example, may want to adopt strategic oil supply measures purely for political or other reasons.
[16] This dissertation adopts the International Energy Agency's (IEA) definition of energy security as "the uninterrupted availability of energy sources at an affordable price." See IEA website, accessed 1July 2014, http://www.iea.org/topics/energysecurity/. This is extended to define oil security to mean oil supply security - the uninterrupted supply of crude oil and oil products at an affordable price.
[17] Oil from the Middle East, a major common source of supply to Asia, for example, does not need to go through the chokepoint of the Strait of Malacca to get to India.
[18] See for example, European Commission, *Towards a European Strategy for the Security of Energy Supply* Green Paper COM(2000) 769. Accessed 10 August 2015, http://eur-lex.europa.eu/legal-

A noticeable level of OV is theorised as a sufficient but not necessary condition that motivates net oil importing states to adopt strategic oil supply measures because of the continued importance of oil security to any economy. In spite of concerted efforts to develop diverse sources of energy after the oil crises of the 1970s, oil remains the most important primary energy source of the world, and the second most important one in the Asia Pacific, after coal. In 2013, it accounted for about 27.5% of the total primary energy consumed in the Asia Pacific,[19] and is projected to remain the most used primary energy source in the world in 2035, even under the most optimistic scenario.[20]

The transportation sector is heavily dependent on oil with no mass-scale substitute fuel for passenger cars or trucks in sight. This sector accounts for over half of global oil consumption.[21] The expected high growth in the number of these vehicles with the rise of the middle class, particularly in China and other countries in Asia that are not members of the Organisation of Economic Cooperation and Development (OECD), is likely to further exacerbate the problem. This no doubt contributes to the low price and income demand elasticities on oil.[22] The almost exclusive status of oil to enable rapid mobility has made it the lifeblood of military operations since World War I. Although the contemporary period is supposed to be the most peaceful in human history,[23] states do not appear to have relaxed their military preparedness, including those in the Asia Pacific region.[24]

While the impact of oil price volatility on an economy is less clear, the adverse effect would be more pronounced in poorer countries and those with higher oil intensities, both elements are formulated in the calculation of OV in this study.[25] Therefore, the

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content/EN/TXT/?uri=CELEX:52000DC0769 and Robert Bacon and Masami Kojima, "Oil Price Risks," *Public Policy Journal* 320 (June 2008), accessed 15 August 2015, http://apps.olin.wustl.edu/faculty/zhang/Energy/World%20Bank%20-%2017%20June%202008.pdf. In her study "Oil Vulnerability Index of Oil-Importing Countries," *Energy Policy* 36 (2008): 1197, Eshita Gupta devises a composite OV index taking into account supply risks and market risks, as well as environmental risks.

[19] *BP Statistical Review of World Energy, June 2014,* 41.

[20] International Energy Agency (IEA), *World Energy Outlook 2011* (Paris: IEA, 2011), 71.

[21] IEA, *World Energy Outlook 2012* (Paris: IEA, 2011), 4.

[22] One study puts the long-term price and income demand elasticities on oil for OECD countries as -0.6 and 0.55 respectively, and those for non-OECD countries as -0.18 and 0.53 respectively. See Dermot Gately and Hillard G. Huntington, "The Asymmetric Effects of Changes in Price and Income on Energy and Oil Demand," *The Energy Journal* 23-1 (2002), 52.

[23] Steven Pinker, *The Better Angels of Our Nature: Why Violence Has Declined*. (London: Penguin Books, 2012).

[24] Five polities in the Asia-Pacific are among the top 10 recipients of arms transfer in the developing world between 1998 and 2005: India, China, Taiwan, South Korea, and Pakistan. See Bruce Vaughn, "U.S. Strategic and Defense Relationships in the Asia-Pacific Region" CRS Report for Congress January 22, 2007, 3.

[25] One estimate suggests that a 10% increase in crude oil prices will cause the gross domestic product to lower by 0.2 to 0.5 % after six quarters. The economic impact of oil price volatility also seems to vary according to the speed of the price change and the background macroeconomic environment at the time of price change. See Hillard G. Huntington, "The Oil Security Problem," *Stanford University*

uninterrupted supply of oil at an affordable price has substantial economic as well as military utility and hence national security significance. It follows that a reliable oil supply is also politically important to any state, regardless of its regime type.

The vulnerability-interaction model argues that an uninterrupted supply of affordable oil is perceived to be so critical to the normal functioning of net importing economies and the survival of the state that a noticeable level of OV is sufficient to generating the desire for adopting some level of strategic oil supply measures. The higher a net oil importing's economy's OV, the greater its desire to adopt strategic oil supply measures would be, *ceteris paribus*. The actual level of these measures adopted, however, would be conditioned by intervening variables (ITVs). Whether and at what level such measures are ultimately adopted depends on the result of the interaction among the economy's OV and all the proposed conditioning factors, which are examined in the following sub-sections.

3.2 Trust in Oil Markets

The first ITV that boosts or restrains a state's desire to adopt strategic oil supply measures is the decision-makers of the polity's trust that oil markets can adequately provide oil security to the economy. The overall level of this trust is theorised here to be negatively correlated to the DV. This means the higher the level of overall trust, the lower the level of strategic oil supply measures would be adopted if all other factors remain the same. It is further theorised that the absence of a high level of trust in the oil markets is an *a priori* (necessary but not sufficient) condition for the adoption of a high level of strategic oil measures by a net oil importing economy.

There is no consensus on the definition of "trust" despite the increasing number of research on the topic in economics and international relations in the last two decades.[26] This project defines trust in the oil markets as states' belief that the private sector operating freely through the existing international markets and a domestic market with minimal government participation is the most efficient, reliable and affordable way to ensure supply to the economy.

Energy Modelling Forum Working Paper, EMP OP 62 (Stanford, Calif.: Stanford University, February 2008), 21-22.

[26] Some examples of the research involving trust include Luigi Guiso, Paola Sapienaza, and Luigi Zingales, "Trusting the Stock Market," *The Journal of Finance* Vol. LXIII, No. 6 (2008), 2557-2600; Todd H. Chiles and John F. McMackin, "Integrating Variable Risk Preferences, Trust, and Transaction Cost Economics," *The Academy of Management Review*, 21-1 (Jan 1996), 73-99; Andrew H. Kydd, *Trust and Mistrust in International Relations* (Princeton, N.J.: Princeton University Press, 2005); Ernst Fehr, "On the Economics and Biology of Trust," *Journal of European Economic Association*, 7-2-3 (2009), 235-266.

This definition is based on the behavioural definition of trust, which incorporates belief with actions. This belief is manifested by a lack of state intervention in those markets and procedures.[27] On the intertwining nature of trust as a belief and as behaviour, Ernst Fehr says: "If trust is a behaviour involving trusting acts, then it is shaped by our beliefs about others' trustworthiness as well as our willingness to accept the risks involved in trusting acts."[28] The vulnerability-interaction model posits that trust in the oil markets has both "objective" and "subjective" components.[29] Another way of understanding trust is that it embodies both behavior and belief, and the two may not be easily teased out in practice.[30] Although these two sets of concepts are only loosely related, both the behavior and belief and the objective and the subjective elements of trust appear to be mutually-reinforcing.[31] The situational precondition of when trust is even called for is the existence of risk or uncertainty. Paraphrasing Chiles and McMackin, without vulnerability to risk, "there is no need to trust."[32]

Since the existence of risks is the precondition of trust, it is worth examining the concept of risk preference.[33] Risk preference refers to whether a party is risk averse, risk neutral, or risk-seeking. In neoclassical economics literature, "a party which is risk averse will always prefer a certain profit to the prospect of fluctuating profits."[34] Adopting this view, it is proposed in this study that a state is risk averse if its default position on oil supply prefers certainty in availability and price to the prospect of fluctuating availability and prices through the open market systems. A risk neutral state is, conversely, indifferent to a prospect of short-term uncertain oil availability and price, if the expected average of the prospective fluctuating availability and prices through the open market systems match in the long run oil availability and price through methods that provides greater certainty.[35] Finally, a risk-seeking state will always prefer fluctuating availability and prices if the expected average

[27] Fehr: 238.
[28] Ibid.
[29] In the case of investing in the stock market, for example, the objective component is "risk-return trade-off given the existing data" and the subjective element is the "faith (trust) that the data in our possession are reliable and that the overall system is fair." Guiso *et al* call these "characteristics" instead of components. See "Trusting the Stock Market," 2557.
[30] Fehr, 236-238. Chiles and McMackin used the term "trust-like behaviour" to pinpoint the behavioural aspect of trust, 86.
[31] On this point, Zand, as quoted in Chiles and McMackin, "described a spiral reinforcement process, in which one's inner state of trust (mistrust) becomes transformed into behaviour that is trusting (mistrusting)." 87.
[32] 85. This precondition is also made clear in Guiso *et al*'s exposition of the objective and subjective characteristics of trust quoted in footnote 29.
[33] Fehr highlights risk as a major component of the behavioural definition of trust, 236-37.
[34] Chiles and McMackin: 81.
[35] This is based on Aoki's explication of risk neutrality which reads, "… a risk neutral party is 'indifferent between a prospect of uncertain profits and a certain profit, provided that the expected average of prospective fluctuating profits is equal to the certain profit." Ibid.

of these fluctuations via the open market system results in greater oil availability and lower prices than certainty in availability and price provided by other methods.[36]

One subjective factor that is likely to affect decision-makers' level of trust in the existing oil markets is their polity's historical experiences with dominant market players, usually the hegemonic power(s) and their allies or close associates. Markets of different periods and products are organised with varying degrees of openness, transparency, and different price-setting mechanisms.[37] Since hegemonic power(s) of successive periods are likely to be the creator, rule and agenda setter, and underwriter of major international economic systems, polities' experiences in these markets would form the basis of decision-makers' current trust in what Guiso *et al* call "the fairness of the game."[38]

The history of the inextricable link between the hegemonic power(s) of the day and firms originated in those powers and the development of oil and the oil markets has been well chronicled by Daniel Yergin's monograph *The Prize*.[39] The various price-finding and determination mechanisms throughout the century of oil's preeminence appear to reflect more closely the power relationships between the major players of different periods than the fundamentals of demand and supply.[40] Even if the "market-related" pricing regime adopted since the mid-1980s is more open and transparent than previous ones, I argue that experiences and impressions from bygone eras would continue to impact on policymakers' decision-making. This is because the hegemonic powers and many of their international oil companies (IOCs) that were closely linked to the various past pricing regimes are still active in the international oil markets, even if to different degrees of dominance and in different permutations.

Another subjective component of trust in the oil markets is political entities' cultural or ideological attitudes towards profit-making and the expected responsibilities of the government towards the underprivileged. I argue that these components would combine

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[36] Chiles and McMackin's definition of risk-seeking reads: "A party that is risk seeking will always prefer a fluctuating profit to the prospect of certain profits, provided the expected average of the fluctuating profit is greater than the expected value of the certain profit." Ibid.

[37] For an insightful examination of the changing nature of the market mechanism, see Harvey and Metcalf, "The Ordering of Change. It demonstrates two different theoretical interpretations of the changing organisations of the Covent Garden food market in the UK throughout its 800 years of existence.

[38] "Trusting the Stock Market," 2557. This reasoning that the preconception of the fairness of the international oil markets would impact decision-makers' overall trust in oil markets and hence affects the level of strategic oil supply measures adopted is partly developed from the Peter Gourevitch's idea of the international sources of domestic politics. See "The Second Image Reversed: The International Sources of Domestic Politics." *International Organization*, 32-4 (1978): 881-912.

[39] *The Prize*, (New York: Touchstone Book, 1993). For a more contemporary and concise study, see Paul Stevens, "The History of Oil," *POLINARES working paper n. 3* (September 2010).

[40] For studies on these various mechanisms, see Bassam Fattouch, "An Anatomy of the Crude Oil Pricing System," *WPM 40*, The Oxford Institute for Energy Studies, (January 2011) and Mabro, "The International Oil Price Regime."

to form unique frames of reference of decision-makers in different polities in interpreting even the same "objective" facts about the existing international oil markets and the allocative efficacy or justice of open markets in general.[41] In this sense, "trust" is still a form of rational calculations, but this rationality is bounded by the unique history, culture, and experiences of decision-makers of individual polities.[42]

The focus of this project does not highlight the deep historical and cultural factors that affect the risk preferences and beliefs of decision-makers due to the immense task of convincingly operationalising and comparing them across political entities. Instead, to indirectly gauge states' levels of trust in the oil markets, the vulnerability-interaction model applies loosely Thierry Balzacq's "pragmatic" or "sociological" approach to securitisation.[43] This approach sees successful securitisation as requiring more than just a "speech act" emphasised by the Copenhagen School. It also hinges on the status of the securitising agent and the external social contexts of the act.[44]

In particular, the theoretical component to be applied here emphasises the presence and coherence of the securitising agent in the form of NOC(s) and the relevance of the context of the securitisation in the discourse on oil security.[45] According to Balzacq, the capacity of securitising agents lies in their use of appropriate "words and cogent frames of reference in a given context, in order to win the support of the target audience for political purpose."[46] The vulnerability-interaction model focuses on an internal context and an external context, relating to decision-makers' trust in the efficacy of the domestic and the international oil market respectively. It hypothesised that the geographic evenness and the degree of economic development of a polity form the internal context affecting decision-

[41] This is similar to the concept of "determinants of risk preferences," which include both "situational" and "constant" factors, such as problem framing, reference points (situational) and individual dispositions, national culture, and organizational cultural (constant). See Chiles and McMackin: 81.
[42] For a discussion of how variants of rationalist models applied in studies in international relations and their critics, see Miles Kahler, "Rationality in international relations," *International Organization* 52-4 (Autumn 1998): 919-941. For how bounded rationality helps decision making in real life situations, see Gerd Giegerenzer and Daniel G. Goldstein, "Reasoning the Fast and Frugal Way: Models of Bounded Rationality," Psychological Review 103-4 (1996): 650-669. For basic concepts of bounded rationality, see Herbert A. Simon, "Theories of Bounded Rationality," in *Models of Bounded Rationality, Volume 2 – Behavioral Economics and Business Organization* (Cambridge: Mass: MIT Press, 1982), 408-423.
[43] See "Constructivism and securitization studies," in *The Routledge Handbook of Security Studies*, ed. Myriam Dunn Cavelty and Victor Mauer (New York: Routledge, 2010), 57. Balzacq also calls this the "strategic approach" to differentiate it from the "speech act view" of securitization of the Copenhagen School. See "The Three Faces of Securitization: Political Agency, Audience and Context," *European Journal of International Relations* 11-2 (2005): 171-172, 192.
[44] Balzacq, "Constructivism and securitization studies," 63. Also see "The Three Faces," 173. For the Copenhagen School's emphasis of the speech act in securitization, see Holger Stritzel, "Towards a Theory of Securitization: Copenhagen and Beyond," *European Journal of International Relations*, 13-3 (Sep 2007): 360-361.
[45] The third factor Balzaq highlights is the audience. "The Three Faces," 192.
[46] Ibid.

makers' trust in adopting an unfettered oil market domestically. Given the historical role of the United States in establishing the international oil markets and its continued preeminence in it, the proposed model hypothesised polity's relationship with the United States as the most important external context to decision-makers' trust in the international oil markets.

3.2.1 Securitising Agents

The blurred line between facts and their interpretations in risk assessment and belief formation puts NOCs in a unique position to be the prime securitising agent in the discourse of oil security. Balzacq highlights the "power positions," "social identity," and the "capacity of the target audience, and…alternative voices within the relevant social field" as aspects impacting on agents' persuasiveness.[47] Once created, NOCs are likely to justify their continued existence, if not further expansion. In addition, they usually have a high concentration of technical and organisational expertise in oil supply issues, which endows their "security utterances" with apparent authority to both decision-makers and the public alike.[48] Of course, NOC executives are not only people who may be motivated to securitise oil supply, as the "Unocal affair" in the United States has dramatically illustrated.[49]

NOCs certainly have the motive as well as the status to do so. This does not mean that NOCs themselves have not been active participants and indeed beneficiaries of the existing international markets at some point since their establishment in the 1980s. Most NOCs of net oil importing economies without a liberalised domestic oil market likely have profited from the differences in prices between the international oil markets and their respective domestic market.[50] Another way they may have benefited is the de facto monopoly many of them enjoy in the domestic market. In general, the more controlled the domestic market is, the more NOCs would lose from it being liberalised, and hence the more reason for them to strategically securitise aspects of the international or domestic oil market.[51] The particular aspects chosen for securitisation are likely the most pertinent to the contexts for their home countries and the most pivotal to their profitability or survivability or both.

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[47] "Constructivism and securitization studies," 64.
[48] Ibid., 173. These are the audience of securitization, the third factor that may impact the effect of securitization in Balzacq's earlier formulation (2005). In his later formulation (2010), he discusses more about the type of "heuristic artefacts" used as the third decisive factors. See Constructivism, 64.
[49] For a detailed examination of how China's National Offshore Oil Corporation's bid for Unocal Oil Company of California was securitised by American political elites such as representatives to the U.S. Congress with a securitisation approach, see Joanna Nyman, "'Red Storm Ahead': Securitization of Energy in US-China Relations," *Millennium: Journal of International Studies* 43-1 (2014): 43-64.
[50] This is especially true for countries still have substantial indigenous oil resources and when the international prices are much higher than domestic prices.
[51] This is no different from a private firm which has been operating in a monopolised and highly regulated market.

I argue here that even if the risk assessment and "facts" of the polity's oil supply situations NOCs promote do not always amount to actual securitisation as understood in securitisation theories, these assessments and representations would at least be equivalent to powerful lobbying or politicisation.[52] As such, they would still skew decision-makers' trust level in oil markets. That is why I mention earlier this analysis only *loosely* adopts the pragmatic approach of securitisation. Following this line of reasoning, the presence of cohesive NOC(s) is theorised to be negatively correlated with the level of trust in the oil markets.

3.2.2 Internal Context of Securitisation

I argue that the evenness and degree of economic development of a political entity provides an important internal context NOCs may readily exploit in their securitising/lobbying effort. These two aspects can combine to affect decision-makers' calculation of the risk of only relying on private firms and the market mechanism to supply oil to most customers at an affordable price in the domestic market. In a continental size country with a large rural and poor population, private oil firms would likely concentrate on supplying oil to the more profitable urban areas, thus leaving the majority of people underserved. This would have a negligible impact on economies that are more evenly developed and/or whose population mostly has reached a high standard of living and hence oil products only take up a relatively smaller percentage of their income.

These supply security issues, of course, may be alleviated to a certain extent by measures such as oil or other energy credits for low-income residents, not to mention the development of renewable or other forms of energy sources. They can, however, also easily be framed by NOCs as an existential threat to a regime, especially one that rules over a polity with a strong expectation of the government as a provider of basic necessities. Intuitively, not attending to the basic needs of a large vulnerable population is conducive to electoral setbacks in democracies and unrest in non-democracies. NOCs can then justify their existence as providers of the required oil supply to this population. Framed in this way, decision-makers' risk preference can easily be pushed from neutral to adverse. Ultimately, all regimes try to survive as long as possible and trust is difficult to come by when the stake is or is believed to be as high as survival. Domestic oil supply security would be especially applicable to the geographic scope of this study as many economies in the Asia Pacific are

[52] An issue would need to be labelled as an "existential threat" that calls for extraordinary measures ("above politics") to reach the level of securitization according to securitization theories. The lower level of the securitisation process is called politicisation. See Barry Buzan and Lene Hansen, *The Evolution of International Security Studies* (New York: Cambridge University Press, 2009), 214.

still relatively poor, underdeveloped, and tend to have more paternalistic cultures than those in the West.

3.2.3 External Context of Securitisation

Polities' relationships with the United States during the period studied is hypothesised in this study to be the context that NOCs and other interested parties may exploit to lower decision-makers' trust in the international oil markets. First, oil is very unevenly distributed geographically and the bulk of it delivered to Asia-Pacific polities relies on a few shipping "chokepoints."[53] Although most Asia-Pacific oil importing economies are heavily dependent on oil that has to be shipped through at least some of these same maritime chokepoints, they are not subjected to the same degree of potential threat of having their oil supply physically cut off. The United States possesses concentrated naval power to control the physical flow of oil along key regional maritime shipping routes.[54] Llewelyn Hughes and Austin Long conclude this may be "the most important long-term security problem in the international oil market," especially for non-U.S. ally oil importing countries in the Asia Pacific, such as China.[55] The international oil markets would fail to provide oil supply security if maritime oil transportation security cannot be assured, especially for the Asia-Pacific.

Second, U.S. oil firms and those originated in countries that are close U.S. allies are still among the biggest and most profitable in the world even if NOCs control most of the world's oil reserves and production.[56] The United States is also the leader in advanced

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[53] Almost 48% of the world's proven oil reserves as of 2013 were found in the Middle East (*BP Statistical Review of World Energy 2014 Workbook*, 6. Accessed 22 August 2014, http://www.bp.com/content/dam/bp/pdf/Energy-economics/statistical-review-2014/BP-statistical-review-of-world-energy-2014-full-report.pdf). For an analysis of maritime oil shipping "chokepoints," see "World Oil Transit Chokepoints," U.S. Energy Information Agency (EIA), accessed 10 August 2015, http://www.eia.gov/beta/international/regions-topics.cfm?RegionTopicID=WOTC.

[54] Llewelyn Hughes and Austin Long, "Is There an Oil Weapon?" Security Implications of Changes in the Structure of the International Oil Market," *International Security*, 39-3 (Winter 2014/2015), 173-180.

[55] Ibid., 188. Of course, if hydrocarbons of marketable quality and prices can be produced in the South China Sea, a new dynamic may develop. This development, however, appears to be rather distant in the future and its effect cannot be accurately estimated at this juncture.

[56] Two of the world's top 10 publicly traded oil companies on the 2013 Forbes Global 2000 list are U.S. oil corporations and four of them originated in close U.S. allies. They are (in descending order of their rank on the list): Exxon Mobil (5), Shell (7), Chevron (13), BP (18), Total (23), and ENI (30). The remaining three are NOC spinoffs or NOCs: China Petrochemical Corporation (4), China National Petroleum Corporations (5), and Petrobras (25). This skips over OAO Gazprom (21) since it only engages in the natural gas, not oil, sector. Accessed 10 September 2016, http://www.economywatch.com/companies/forbes-list. According to the World Bank's estimate as of 2010, NOCs controlled 90% of the world's oil reserve and 75% of the production. See Silvana Tordo *et al*, *National Oil Companies and Value Creation, Volume I* (Washington, D.C.: The World Bank, 2011), xi.

oil production technologies and equipment, such as hydraulic fracturing and horizontal drilling, which may prove a game changer in global oil productivity.[57]

Objectively, these facts should not have a direct bearing on decision-makers' trust in the existing international oil markets. I argue, however, they can provide the needed external context for persuasive NOCs and other interested parties of net oil importing countries to sow doubts in the wisdom of solely relying on these markets or the fairness of the system.[58] This external context is especially pertinent in a region that appears to be still traumatised by colonialism, mostly inflicted by the dominant market players as recently as the first half of the last century.[59] One way to exploit this external context for securitisation is to promote a zero-sum view of the international political economy and to project the same intentions onto other nations, especially the United States, the dominant power of the existing international political and economic systems.

If decision-makers take it for granted that leaders of the United States also adopt this zero-sum worldview, the risk of over-reliance on the international oil markets for supply during any confrontational situations with it can credibly be securitised. The United States and companies originated there can be portrayed as trying to perpetuate their historical dominance by whatever means possible, especially toward political entities not having a friendly relationship with them. NOCs in these political entities can indirectly justify their existence, both to make alternative arrangements in preparation for any future confrontations and to participate in the international markets to reap the benefits for the nation while the "good time" lasts. In short, this is an aggressive zero-sum form of economic nationalism.[60]

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[57] This has rapidly increased the global share of the United States' oil production from 8.98% in 2010 to 13.86% in 2015. The calculation is made from data on *BP Statistical Review of World Energy June 2016*, 8. The lifting of export ban on oil and gas by the U.S. government in December 2015 allows resources extracted with that technology in the United States be directly supplied to external buyers. BP also predicts that the United States will be "energy self-sufficient by 2021" and "oil self-sufficient by 2030." See Bob Bryan, "BP: The US will be energy independent in 5 years," *Insider Australia*, 25 March 2016. Accessed 12 December 2016, http://www.businessinsider.com.au/bp-us-energy-self-sufficient-in-5-years-2016-3?r=US&IR=T.

[58] An official Indian think-tank report, for example, makes the argument that America's energy independence resulting from its advanced hydrocarbon E&P technologies has different implications for China, India, and the world at large. See Shebonti Ray Dadwal, *The Geopolitics of America's Energy Independence: Implications for China, India and the Global Energy Market* (Delhi, Institute for Defense Studies & Analyses, 2013). In addition, Defense establishments are possible "interested parties" since playing up the likeliness of the United States using its superior naval capability to block maritime oil transportation would be one way to justify and increase their budget shares.

[59] For the lingering impact on the perception and foreign policies of two major powers in Asia, see Manjari Chatterjee Miller, *Wronged by Empire: post-imperial ideology and foreign policy in India and China*. Stanford, California, 2013.

[60] Some studies use the term "mercantilist" or "neomercantilist" to describe some countries' energy acquisition behaviour, which mostly mean a state-led versus market-led strategy with a zero-sum mentality. Economic nationalism is more appropriate to describe the situation wherein nations employ a diverse array of economic policies to achieve the underlying goal of "bolstering power, prestige, or the prosperity of the nation." Economic nationalism is not necessarily zero-sum in

The coherence of oil supply securitising agents and the relevance of the internal and external contexts of securitisation in individual net oil importing economies are theorised to be the most pertinent in contributing to decision-makers' overall trust level in the oil markets. The coherence of securitising agents is theorised here to be positively correlated to the level of trust in the oil markets, while the relevance of securitising contexts, both internal and external, is negatively correlated.

3.3 Implementation Capability

The second intervening variable (ITV) that conditions the actual level of strategic oil supply measures adopted is a polity's capabilities to implement such measures. The vulnerability-interaction model theorises this explanatory factor to be positively correlated to the actual level of strategic oil measures adopted by a net oil importing economy. This means that the higher the economy's implementation capability, the higher the level of these measures would be adopted if all other explanatory factors remain the same.

Implementation capability refers to material capabilities and capabilities that can directly facilitate the adoption of strategic oil supply measures. These include an economy's financial, technical, diplomatic, and bureaucratic capabilities. Many of these measures, such as establishing or administering NOCs or strategic petroleum reserves (SPR), are capital-intensive, and require technical as well as organisational skills. Some others, such as backing a pariah oil producing state at the United Nations, call for considerable political or diplomatic capital.

An equally important factor that would affect states' capability to mobilise and use these resources is the degree of centralisation of state authority. Samuels has studied the effect of both the horizontal and vertical concentration of state authority on the extent of state intervention in various energy sectors in Japan. The vulnerability-interaction model accepts Samuels' proposition that a highly centralised state would intervene in what he calls a more "market-displacing" manner if all other factors remain equal. For the sake of simplicity, however, this study mostly focuses on how consolidated the capabilities and authority of national governments are (horizontal concentration). The balance of power

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orientation, but it is much easier to securitise oil supply to promote and project both economic nationalism and a zero-sum understanding of the international political economy. For a discussion of the historical origin and contemporary understanding, including the definition quoted earlier, of economic nationalism, see Eric Helleiner, "Economic Nationalism as a Challenge to Economic Liberalism? Lessons from the 19th Century," *International Studies Quarterly*, 46-3 (September 2002): 307-329 (definition on page 310). For examples of studies using "mercantilism" or "neomercantilism" to describe countries' energy acquisition strategies, see Jeffrey Wilson "Northeast Asian Resource Security Strategies and International Resource Politics in Asia," *Asian Studies Review* 38:1 (2014): 15-35 and Charles E. Ziegler and Rajan Menon, "Neomercantilism and Great-Power Energy Competition in Central Asia and the Caspian," *Strategic Studies Quarterly* (Summer 2014): 17-41.

between the national and the local or regional governments (vertical concentration) should be less important as oil supply measures in most net oil importing economies are to a great extent externally-oriented. Foreign economic policymaking, especially in the oil sector, is mostly the domain of the national government.

There are subtle but important differences between implementation capability and the concept of the strength of state capital, which is an important component of the last ITV of the proposed model. As further explained in the next sub-section, the strength of state capital includes material capability. More critically, however, it refers to the institution-endowed authority to implement economic policies at will in the domestic domain unencumbered by private capital interests. Some examples of institutions that are pivotal to the strength of state capital are property rights laws, environmental regulations, and the judicial system in general. Logically the degree of centralisation of state authority would have an impact on both implementation capability and strength of state capital. Centralisation of authority is only factored in this second ITV for parsimony. The third ITV would only concentrate on issues related to the overall economic freedom and openness, not the concentration or the exercise of political power, in the polity. Finally, the emphasis of the next IVT is the strength of the private capital in relation to that of the state, especially in the various petroleum sectors.

In short, a net oil importing economy's capability to implement strategic oil supply measures has a very tight focus. Only the "resource supplier" role of the state is investigated.[61] The capability to implement these measures is deduced here to be so important that having a high capability is theorised as the other *a priori* condition for the adoption of a high level of DV. This is because capability is the requisite material conditions to realise any desire to adopt strategic oil supply measures and it is relatively immutable over the short to medium term.

Adopting strategic oil supply measures is to some extent a "non-financial" hedge against market failure and physical supply risks. Hedging may provide security, but it does incur costs. Only those who are capable can bear the costs, thus the necessity of having a high capability to actually adopt a high level of these measures. The vulnerability-interaction model, however, does not suggest all economies that are capable would engage in this type of hedging, especially not to a degree proportionate to their capabilities.[62] An economy with

[61] The term "resource supplier" is borrowed and adapted from Jonas Meckling, Bo Kong, and Tanvi Madan, Meckling, Jonas, Kong, Bo, and Madan, Tanvi. "Oil and state capitalism – government-firm coopetition in China and India." *Review of International Political Economy* 22-6 (2015):1159-1187.
[62] Again, this is concordant with the notion of asymmetry in set theoretic methods: "insights on the causal role of a condition are of only limited use for the causal role of its absence." See Schneider and Wagemann, 3.3.3.

a high capability as well as a high level of trust in the oil markets, for example, may not adopt a high level of strategic oil measures according to the logic of the proposed model.

3.4 Strength of Private Capital

The last ITV that interacts with OV to determine the actual level of strategic oil measures adopted is the overall strength of private capital versus that of the state. The vulnerability-interaction model theorises that this factor negatively correlates with the DV. This means that the greater the overall strength of private capital is in a net oil importing economy, the lower the level of strategic oil supply measures would be adopted if all other factors remain the same.

The model proposed here posits that the relative strength of private capital in an economy has two major sources: historical-institutional and actor-specific. The strength of private capital in any particular industry is conditioned by both the long-term institutional configurations of the economy, as well as the more immediate actor-specific configurations of that industry.

A polity's level of overall economic freedom summarises its institutional and historical limits on the strength of private capital versus that of the central government. The proposed model posits that the freer and more open a polity's overall economy is at any given time, the more resistance to the adoption of strategic oil supply measures would be. This would in turn result in fewer such measures actually being adopted or a lower DV, if all other factors remain equal.

The actor-specific source's impact on the private-state-capital-strength balance focuses on the power of both domestic and international private capitals have versus that of the state in the form of state-owned enterprises (SOEs) in different sectors of the oil supply chain. This balance simultaneously contributes to and is impacted by the overall strength of private capital in the economy. This is an expansion of the concept of "state capacity" or "state structure" in independent economic and other policymaking expounded in earlier studies in two ways.[63] First, it explicitly factors in the relative strength of private capital and state capital in the form of SOEs, particularly NOCs, in the economy. Second, it disaggregates private capital into international capital and domestic capital because the two may not have the same preferences on domestic market governance at all times.

Historically, U.S. and European firms were the only international oil companies and indeed other types of multinational firms. SOEs have not been very prominent in Western Europe and almost non-existent in the United States in the last couple of decades.

[63] See for example *The Business of the Japanese State*, 5-7; Stephen D. Krasner, *Defending the National Interest: Raw Materials Investments and U.S. Foreign Policy* (Princeton, NJ: Princeton University Press, 1984), 55-57; and Ikenberry, "The Irony of State Strength," 122, 133-135.

The dramatic "rise" of non-Western economies and the partial liberalisation of global capital movement during the period covered by this study justify a more detailed understanding of these dynamics on the adoption of strategic oil supply measures. This is because SOEs in general are still commonly found in many net oil importing economies in the Asia-Pacific and domestic capital in this region can hardly be equated with international capital as in the case of the United States, and to a lesser degree Western Europe, in the last century.[64]

Private investments in most economies during the period examined in this project came from both international and domestic capitals in a number of sectors, often including those responsible for directly supplying oil to the economy.[65] The preference of international capital is hypothesised to be freedom of actions from state intervention or competition.[66] Its strength in an economy, therefore, is theorised here to have a negative correlation with the level of strategic oil supply measures adopted by the state. The relationship between domestic private capital and the state is more complicated. There are four possible scenarios regarding the strength of domestic private capital vis-à-vis those of international capital as well as SOEs at any particular point in time.

First, if domestic private capital is stronger than or at parity with both international capital and NOCs in absolute terms, it would have a similar preference regarding state intervention and the same correlation with the DV as those of international capital as specified earlier. This is because not only would domestic oil firms feel confident in competing with multinational companies or SOEs, they would also prefer a liberal trade regime at home so they can more convincingly push for the opening of overseas markets.[67]

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[64] Nanà de Graaff goes so far as to explain the current "global energy order" as a result of the "hybridization" of two underlying driving dynamics: the relentless "widening and deepening" of the "transnational dimension" of the more liquid global capital and the "continuation and rearticulation of state power" in the current era. Her study inspires the overall private capital-state strength conceptualization in this section. See "The Hybridization of the State-Capital Nexus in the Global Energy Order," *Globalizations* 9:4 (2012): 531-545.

[65] Private capital refers to relatively bigger businesses in this project versus small businesses and household production. The reason for this is twofold. First, almost all international capital (inflow foreign direct investments) comes in the form of larger businesses or institutional financial portfolio investors in most sectors, including and especially in the oil supply sector. Second, the small size and diffuse nature of small business owners and household producers often render them not very coherent or consistent. They also are in competition with larger businesses for capital and labour and in general almost never engage in the oil supply sectors.

[66] Illegal and other dubious acts to gain special access, such as bribery and corruption, are excluded in the consideration here, even if multinational corporations are far from immune to such acts. For a discussion of multinational firms engaging in corrupt practices, see Joel S. Hellman *et al*, "Far from Home: Do Foreign Investors Import Higher Standards of Governance in Transition Economies?" The World Bank 2002, accessed 1 September 2016, http://siteresources.worldbank.org/INTWBIGOVANTCOR/Resources/farfromhome.pdf. Again, state/polity intervention is used here in the sense that excludes the affirmative use of market instruments by the state.

[67] This is a simplified and partial application of the logic Hughes uses to explain the different degrees of openness of oil market governance in France, Japan, and the United States. See Hughes, *Globalizing Oil*.

Second, if domestic private capital is weaker than international capital in either absolute terms or only in the domestic market, but stronger than or at parity with NOCs, it would try to "capture" or "influence" the state to implement preferential policies in its favour.[68] These policies would include but not limited to setting up entry barriers to international firms and capital to the domestic market so domestic corporations can buy time to grow stronger to compete with international capital. In this scenario, it is possible that the actor-specific source may have a positive correlation with the DV. This suggests that a greater domestic capital strength versus that of the state (but weaker than that of international capital) may result in a higher level of strategic oil supply measures adopted. Whether this positive correlation would realise and the extent of it depend on the degree of success of the capturing effort. The situation will only change when and if domestic capital grows to the point of having equal or greater strength than international capital and NOCs in absolute terms.[69] At that point, the correlation with the DV would revert to the same as the first scenario, resulting in a negative correlation.

The third scenario is domestic private capital being weaker than both international capital and NOCs. In this case, the correlation of this source of the ITV with the DV would depend on the orientation of the state. The orientation of the state in the oil supply sectors is hypothesised as being predicated on the economy's OV and decision-makers' trust in the oil markets.[70] As these are already factored in two other explanatory variables of the vulnerability-interaction model, their effects will be counted as neutral in this ITV. Unless international capital is totally absent in an economy, in this scenario, the correlation of this source of the ITV with the DV would also be negative. This is because with the effect between domestic private capital and NOCs neutralised, the always negative correlation of international capital with the state becomes the overall private capital-state strength balance. In general, the greater the presence of international capital already has in the domestic

[68] I use the terms "capture" and "influence" in a broad sense which would include a wide range of tactics such as lobbying, electioneering, securitising, or appealing to the nationalistic sentiments of existing governing elites and/or the public. The term "capture" is used in a narrow sense to mean corruption in the state capture literature. For an example of equating state capture with corrupt practices, see Joel S. Hellman *et al*, "Seize the state, seize the day: state capture and influence in transition economies," *Journal of Comparative Economies* 31(2003), 751-773. Of course, this "capture" would only be necessary if the state does not already have a pro-domestic businesses orientation or agenda already.

[69] Hypothetically, there is another way the situation may change, but it is has yet to be observed in reality: the state grows stronger *and* its orientation changes from championing domestic capital to being totally even-handed towards both domestic and international capital or even favouring international capital.

[70] The orientation of the state towards its adherence to free market principles for the economy as a whole is a complex interaction of factors such as the ideological legacy of the ruling elites and the experience the economy has with the free market as a mode of organisation of exchange both internally and externally.

market of an economy, versus those of the domestic private capital and NOCs, the more pronounced the negative correlation would be.

The fourth scenario - domestic private capital being stronger than international capital but weaker than NOCs in absolute terms - is logically possible but empirically improbable. This is especially true in the region and timeframe that are reviewed in this thesis. If the situation does emerge, domestic private capital again would behave in a way that is negatively correlated with the DV. The contest for control or freedom of action essentially would be simplified from a three-way to a two-way dynamic. The situation is similar to that of scenario 1 above. Figure 2.1 below summarises the hypothesised relationships between domestic private capital and the DV:

		International Capital	
		Stronger	Weaker
NOCs	Stronger	Negative **Scenario 1**	May be positive due to state "capture" **Scenario 2**
	Weaker	Negative but empirically improbable **Scenario 4**	Negative due to effect of int'l capital. Effect of domestic capital counts as neutral **Scenario 3**

Figure 2.1 Actor-specific component correlation with DV, depicted as domestic private capital's relationship vis-à-vis strength of international capital and NOCs

The analysis above shows that in at least three out of the four scenarios, the actor-specific source of the overall private capital strength would have a negative correlation with the DV. The historical-institutional source of this ITV, as manifested in the degree of overall economic freedom and openness, is theorised to always have a negative correlation. Therefore, the cursory understanding of this explanatory factor is that the stronger private capital is in an economy, the lower the level of strategic oil supply measures would be adopted. Figure 2.2 below summarises the overall correlation of this explanatory variable with the DV of the proposed model and the component parts of the variable:

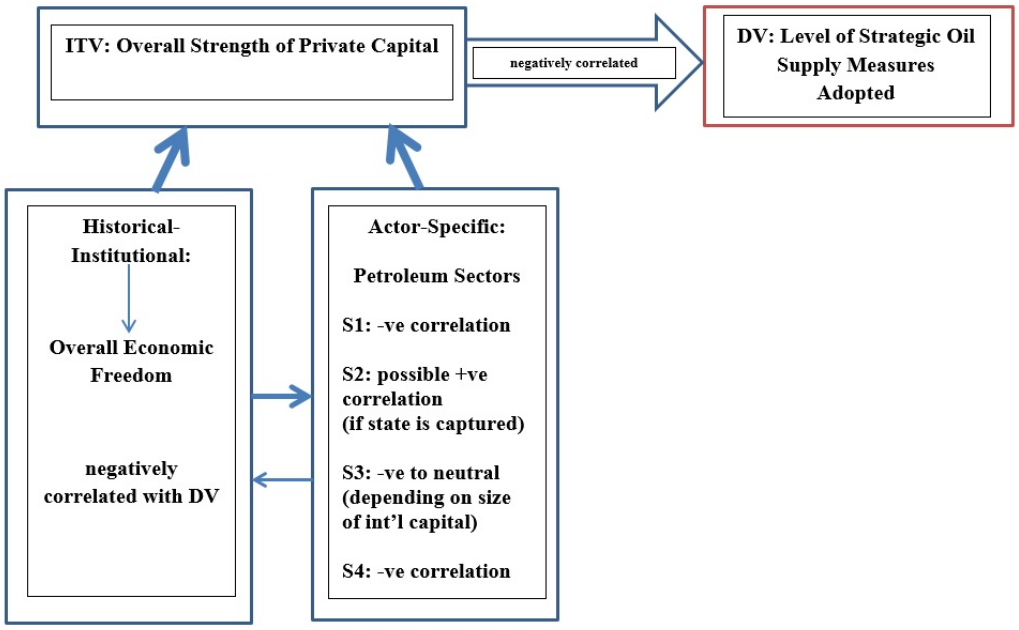

Figure 2.2 Relationship Between Overall Private Capital Strength and DV

Having examined all the explanatory variables, I will next delineated the causal relationships among these variables and formally state the hypotheses generated from the reasoning of the vulnerability-interaction model.

4. Beyond Vulnerability

The vulnerability-interaction model argues that a noticeable level of OV is a sufficient but not necessary condition that *motivates* decision-makers of net oil importing economies to adopt some level of strategic oil supply measures.[71] Having the motivation to adopt such measures does not necessarily translate into the actual adoption of them. It is argued here that the desire to adopt these measures is conditioned by three major factors: decision-makers' level of trust that oil markets can adequately provide oil security; the capability of the state to implement such measures; and the relative strength of private capital versus that of the state in an economy. The *actual* level of strategic oil supply measures adopted - the DV of the model under consideration here - would be the result of the interaction among these four factors: OV as the independent variable and the three conditioning factors as ITVs. Specifically, the vulnerability-interaction model posits that all other factors being equal, the DV would be higher if: (1) there is higher OV; or (2) a lower level of trust that oil markets can adequately provide oil security; or (3) a higher overall

[71] A "noticeable level" is defined here as having an OV score of 10 and above out of a maximum of 100. Economies known to be on the verge of turning into net oil importers, such as Malaysia, have an OV score around 10 using the computation methods adopted in the preliminary study in this project and data from the *BP Statistical Review of World Energy 2014*.

capability to implement the measures; or (4) Private capital overall is stronger than state capital in the economy.

At this stage of its development, the vulnerability-interaction model can only specify the result of the interaction of these explanatory variables in four cases.[72] The two hypothetical "extreme cases" according to the reasoning above are: (1) a net oil importing economy with a low OV, high trust, low capability, and high-strength private capital would adopt a low level of interventionist or strategic oil supply measures or none at all; and (2) one with a high OV, low trust, high capability, and low-strength private capital would adopt a high level of such measures. Each of the four explanatory variables at the stipulated level in each case is by itself a necessary but not sufficient condition to the designated level of strategic oil measures adopted. To put it slightly differently, each of these extreme cases or groupings of explanatory variables as a whole forms an unnecessary but sufficient pathway or an INUS cause to the adoption of respectively a low and a high level of strategic oil supply measures. The other two pathways are discussed in Section 4.2. Figure 2.3 below provides a graphical representation of these four cases: one pathway leading to the adoption of a low level of DV and the three pathways to a high DV that are proposed:

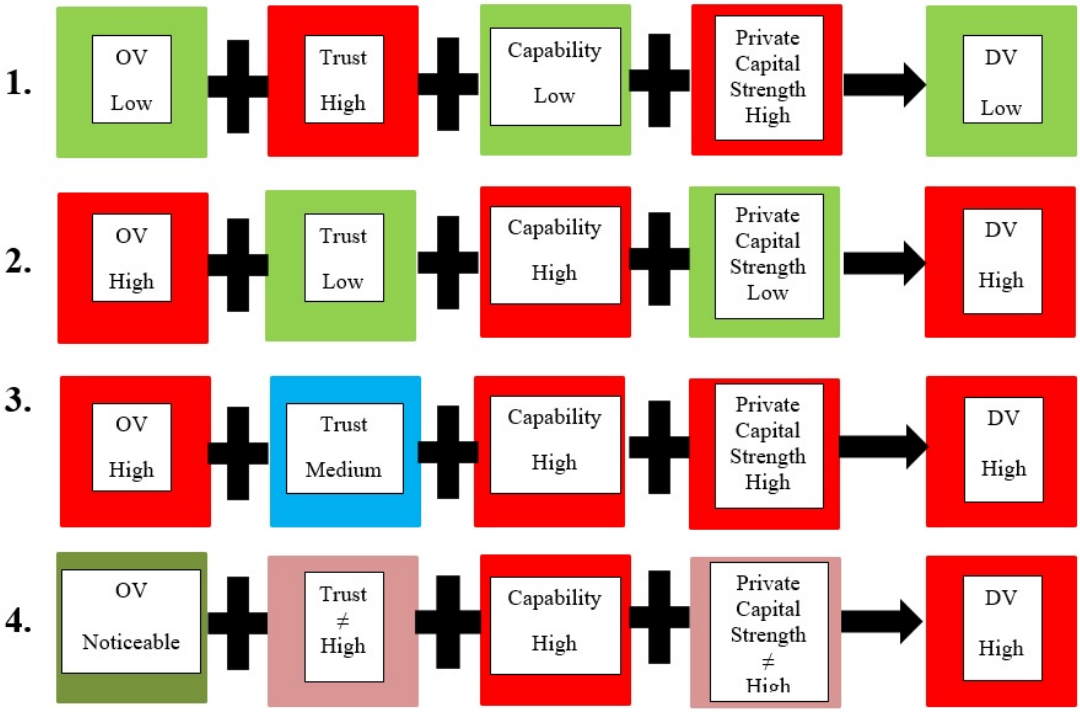

Figure 2.3 Causal Pathways to Adoption of Strategic Oil Supply Measures

The vulnerability-interaction model applies the logic stated earlier to seek answers to the two research questions of this thesis and hence has two distinct layers. The

[72] To facilitate deduction and render hypothesising manageable, all explanatory factors as well as the DV, originally conceptualised as continuous, are converted into trichotomous ordinal variables in the discussions of both layers of the model.

first layer tries to explain variations in the level of strategic oil supply measures adopted by net oil importing economies. The second layer tries to understand what causes the adoption of a high level of such measures by some of these economies. The next two sub-sections present two hypotheses for each of these two layers to be tested in the empirical chapters.

4.1 Explaining Variations

The first layer of the vulnerability-interaction model explains variations in DV levels among or within cases with two hypotheses:

H1: If the levels of all four explanatory factors (IV & ITVs) are similar in two cases, the value of their DV should be similar; and

H2: If the levels of three factors are similar in two cases, their DV levels should be congruent with the result caused by the difference in their fourth factor as predicted by the model.

If the only substantive difference in the levels of the four factors between two cases is their OV, for example, the case with the higher OV should have a higher DV. If the only substantive difference is the economies' trust in the oil markets, the one with an overall higher trust should have a lower DV.

The relational nature of the logic enables the testing of hypotheses without setting fixed thresholds of the levels of the variables *a prior* arbitrarily. This means that whether an economy is designated as having adopted a high, medium, or low level of strategic measures at a certain period during the empirical test of this layer of the model depends on the cohort of economies being tested. This has the benefit of not having first to determine and justify the category thresholds and presumably is less bias-prone.

This layer of the model also has a cross-temporal dimension, meaning H1 and H2 are supposed to be applicable to comparisons between meaningfully different periods within the same economy in addition to among different economies. What constitutes meaningfully different periods is debatable. As further explained in the empirical strategy in the last section in this chapter, it is argued that the two-decade period of this study can be meaningfully divided into two equal-length periods to test this cross-temporal dimension of the model, one representing a decade of low and the other high oil prices in the international markets respectively.

4.2 Explaining High Level of Intervention

The second layer of the model investigates the most puzzling cases of a high level of state intervention in oil supply against the background of thriving international oil trade and increasingly liberalising domestic oil sector governance. Apart from the "extreme" case stated earlier, the vulnerability-interaction model proposes two causal pathways or combinations of specific levels of the four explanatory factors that would result in the

adoption of a high level of strategic oil measures. These two hypotheses are generated with the help of typologising techniques.[73] Each of the hypotheses below corresponds to the pathway of the same number in figure 2.3 earlier.

H3: A net oil importing economy that has adopted a high level of strategic oil supply measures would have a high capability, high OV, high-strength private capital, and a medium level of trust in oil markets (three-high case).

H4: A net oil importing economy that has adopted a high level of strategic oil supply measures would have a high capability, a noticeable OV, and must NOT have high trust in oil markets, nor high-strength private capital (non-three-high case).

4.2.1 Typologising Adoption of High Level of Strategic Oil Supply Measures

Typologising is used to help the generation of hypotheses pertaining to pathways leading to the adoption of a high level of strategic oil supply measures, which resulted in H3 and H4 stated above.[74] While the validity of H3 and H4 will be examined with cases in this thesis, their applicability is also open to the possibility of being generalised to other net oil importing economies. Typologising is an appropriate tool to achieve both goals as typological theories are designed to identify "both *actual* and *potential* conjunctions of variables, or sequences of events and linkages between causes and effects that may recur" [emphases added].[75]

The vulnerability-interaction model posits two *a priori* necessary but not sufficient conditions for a net oil importing economy to adopt a high level of strategic oil supply measures: (1) a high capability to implement strategic oil measures by the state or polity under review; and (2) decision-makers of the state or polity not having a high level of trust in oil markets. Therefore, there are only three variables that need to be taken into consideration: OV, strength of private capital versus that of the state, and trust in oil markets. Figure 2.4 below shows all 18 mathematically possible configurations or pathways leading to a high level of DV with the capability being fixed at a high level:

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[73] Pathways to low DV in absolute terms cannot be meaningfully generated at this time because I cannot specify at least one *a priori* necessary condition (a specific level of one of the four factors) for a low DV. Therefore, there are too many mathematically possible pathways even in trichotomous (3^4=81) configurations to make testing them practical. For an explanation of how this number comes about and the process of how to construct an explanatory typology in general, versus more descriptive typologies, see Elman "Explanatory Typologies in Qualitative Studies of International Politics," 293-326.

[74] Typologies do not handle well variables without fixed boundaries, like the relative logic used in H1 and H2. This is because the "property space" or visual presentation of any explanatory typology is made of rows and columns, each representing a certain value of a discreet ordinal IV or ITV of the theory. Ibid, 296.

[75] George and Bennett, 236.

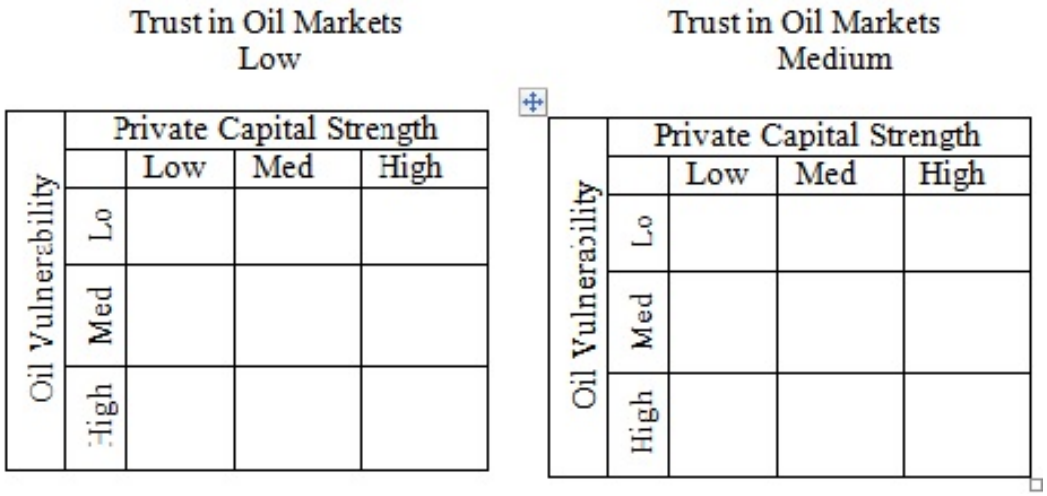

Figure 2.4 Pathways to High Level of Strategic Oil Supply Measures With High Capability

Explaining any phenomenon with eighteen different causal pathways is neither satisfactory nor practical even in a relatively large-*N* study.[76] The typological technique of "logical compression" is therefore used to cut down the number of pathways leading to a high level of DV. This technique can be used when "there may be a connection between two or more of the typology's dimensions such that some combinations are logically impossible or highly improbable."[77] I submit that it is highly improbable that an economy in which private capital has a high strength versus state capital in the overall economy would have a low level of trust in oil markets at the same time. Therefore, those three combinations or cells can be logically eliminated (cell group 1). Following the deductive reasoning underpinning the vulnerability-interaction model, I also argue that it is highly improbable that an economy in which private capital has high strength overall, has a medium level of trust in oil markets AND low or medium OV would adopt a high level of strategic oil supply measures, even with high capability. Therefore, the two cells representing these combinations can be logically eliminated (cell group 2) as illustrated in Figure 2.5 below:

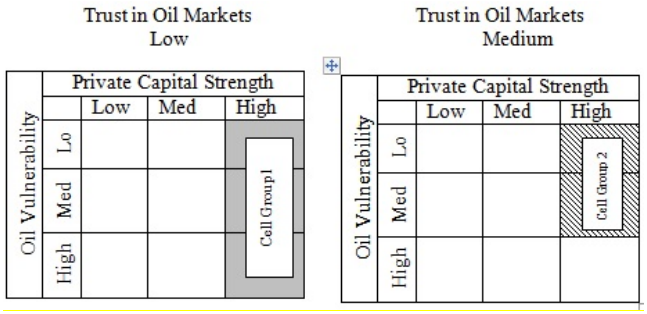

Figure 2.5 Pathways to High Level of Strategic Oil Supply Measures With High Capability and Logical Compression

[76] In statistical studies, this causes the degrees of freedom problem. In case studies, this causes the problem of "indeterminacy." For a discussion of these two issues, see George and Bennett, 26-30.
[77] Elman, "Explanatory Typologies in Qualitative Studies of International Politics," 305.

Five pathways or cells are deleted and 13 pathways leading to a high level of DV remains after applying this compression technique. All these pathways are detailed in Appendix A. The technique of "pragmatic compression," which means collapsing "contiguous cells if their division serves no useful theoretical purpose,"[78] is applied next. After all the compression is done, two pathways remain: the conditions stipulated as H3 and H4 earlier.[79] Each explanatory variable at its specified level is a necessary condition for each pathway or INUS cause. These pathways are also the "types" of conditions that the vulnerability-interaction model hypothesises that would lead to the adoption of a high level of strategic oil supply measures by net oil importing economies. They are labeled the Three-High type (H3) and the Non-Three-High type (H4).

This concludes the reasoning underlying the vulnerability-interaction model developed in this study. The following section reviews what this author contends to be the most germane literature explaining oil importing states' intervention in their economies' oil supply and how this study relates to the literature.

5. Literature on State Intervention in Oil Supply

The literature on state intervention in oil supply in net oil importing most relevant to this study can be roughly divided into two categories. The first is mostly normative: why states should or should not intervene and how. The other is mostly positive: focusing on explaining states' actions and inaction from observations, evidence and logical deductions.[80]

5.1 Normative Literature

There are two main strands of prescriptive literature: those based on neoliberal economic theories and those taking the Realist or geopolitical perspective. The first strand asserts that governments generally should refrain from intervening in their economies' oil supply except to liberalise the oil sector or to use "market instrument" affirmatively,[81] such as lowering tariffs on imported oil or subsidies to domestic oil production.[82] Even if there are some negative externalities associated with oil consumption and import, individual governments cannot do much to effectively ameliorate the situation, especially from the

[78] Elman, 301.
[79] See Appendix A for details of the pragmatic compression process.
[80] For discussions of the difference between normative and positive theories in economics, political science and other disciplines, see Manuel Velasquez, "Normative Theory Versus Positive Theory," in *Encyclopaedias of Business Ethics and Society*, ed. Robert W. Kolb (Thousand Oaks, CA: Sage Publications, 2015), 1524-1525.
[81] Ikenberry, "The Irony of State Strength," 132.
[82] William Nordhaus, "The Economics of an Integrated World Oil Market" (keynote address, International Energy Workshop, Venice, Italy, June 17-19, 2009), 12-13. Also see M. A. Adelman, *The World Petroleum Market* (Baltimore, MD: The Johns Hopkins University Press, 1972).

supply side and in the short run.[83] This is especially true now that oil is a fungible commodity traded in an integrated market.[84]

Neoliberal institutionalist ideas also underpin research related to oil and energy policies and these writings are at least implicitly prescriptive. They expound the superior allocative power of the market relative to the state, the positive role played by domestic and transnational "market ordering institutions,"[85] and the positive-sum nature of international trade and cooperation, including oil.[86] Therefore, these writings provide similar "prescriptions" as those suggested by neoliberal economists.

The Realist or geopolitical perspective normative literature does not offer a unified conclusion on how states should intervene in their economies' oil supply, but its focus on the connection between dependency on imported oil and national security means state intervention in oil and energy supply is taken for granted.[87] These writings do not focus on the need to elaborate what cause oil importing states to adopt measures that would enhance their economies' oil supply. Market measures are accepted as an expedient rather than actively pursued as a matter of principle. Energy is viewed as "a subset of global power politics and a legitimate tool of foreign policy, and [energy security realists] are skeptical of the current energy market's ability to guarantee long-term supply."[88]

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[83] One negative economic externality is inflationary pressure for the whole economy. Bohi and Toma think the development of SPR would only be effective with the coordinated stock drawdown of numerous countries. They also suggest that the only government measure that can address "numerous market failures" is supporting energy research and development that would increase the "price elasticity of either world oil supply or demand." ("Energy Security: Externalities and Policies," 1107). Leiby dismisses import tariff as an effective measure to increase energy security as it does not address "the root market failures," which is "non-competitive global oil supply" and "failure of long-term private oil market transactions to foresee and account for the economy-wide macroeconomic dislocation." See Paul N. Leiby, "Estimating the Energy Security Benefits of Reduced U.S. Oil Imports," Oak Ridge National Laboratory, Oak Ridge, Tennessee, February 28, 2007, 12. Also see Jerry Taylor and Peter Van Doren, "The Energy Security Obsession," *The Georgetown Journal of Law and Public Policy* 6-2 (2008): 475-485.

[84] Nordhaus, "The Economics of an Integrated World Oil Market," 2; David G. Victor, "What Resource Wars?" *The National Interest*, 92 (Nov/Dec 2007), 49.

[85] This term is used by Edward Stoddard in "Reconsidering the Ontological Foundations of International Energy Affairs: Realist Geopolitics, Market Liberalism and a Politico-Economic Alternative," *European Security* 22-4, 445.

[86] Examples of such works include: Dries Lesage *et al*., *Global Energy Governance in a Multipolar World* (Surrey, England: Ashgate, 2010); Andreas Goldthaus and Jan Martin Witte ed. *Global Energy Governance – The New Rules of the Game* (Berlin: Global Policy Institute, 2010).

[87] Examples of such works include: Joan Edelman Spero, "Energy Self-Sufficiency and National Security," *Proceedings of the Academy of Political Science* 31-2: 123-136; Charles K. Ebinger, *The Critical Link: Energy and National Security in the 1980s* (Cambridge: Ballinger Publishing Co., 1982); and Bruce Andre Beaubouef, *Strategic Petroleum Reserve: U.S. Energy Security and Oil Politics* (College Station, TX: Texas A&M University Press, 2007).

[88] Gal Luft and Anne Korin, "Realism and Idealism in the Energy Security Debate," in *Energy Security Challenges for the 21st Century: A Reference Handbook*, ed. Gal Luft and Anne Korin (Santa Barbara, Calif: Praeger Security International, 2009)*:* 340. Some examples of the realist views of the state's role in acquiring natural resources, especially oil, can be found in Robert Gilpin, *War and Change in World Politics* (Cambridge, UK: Cambridge University Press, 1981), 224. For more contemporary exposition of such approach, see Guo Xuetang, "Energy and Geopolitics in Eurasia,"

A variant of the second strand of normative literature describes one or more states' oil supply related activities and then prescribe how other state(s) should respond. China and sometimes India or Asia at large is the usual subjects that have their overseas oil supply enhancing activities examined and the United States and occasionally the European Union are the ones receiving the "advice." These works typically proffer comprehensive measures, such as cooperation in developing alternative energy sources and helping China and other major emerging oil consumers to reduce their demand on hydrocarbons.[89] Michael Klare's works exemplify this variant of literature despite their very Realist-oriented warnings of conflicts over resources, especially oil, if the eclectic measures prescribed are not taken seriously. [90]

Normative studies based on neoliberal economics can hardly explain why some states continue to intervene in their economies' oil supply at a high level in the last two decades, nor do they explain the cross-economy variations in the levels of state intervention. Those with a Realist perspective theoretically would explain the high level of state intervention with the strategic importance of oil. It would explain the cross-economy variations in the levels of intervention mainly with the differences in material capabilities among states. In any event, explaining variations in the levels of intervention among states and across time is not the emphasis of this normative literature, but is exactly what the vulnerability-interaction model proposes to explain. The next category of literature reviewed, similar to this thesis, is more interested in understanding the cause(s) of these variations.

5.2 Positive Literature

The positive literature on oil policies has a wide range of scopes and emphases on its explanatory function. Some, especially writings on net oil importing economies in Asia,

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China Military Science, 19-3 (2006), 74-81[郭学堂，中欧亚地区的能源与地缘政治《中国军事学术》], Robert A. Manning, "The Asian Energy Predicament," *Survival* 42-3 (Autumn 2000): 73-88, and Brent Boekestein and Jeffrey Henderson, "Thirsty Dragon, Hungry Eagle – Oil Security in Sino-US Relations," *IPEG Papers in Global Political Economy* No. 21 (November 2005).

[89] See John V. Mitchell, "Asia's New Role in Global Energy Security," *Oil and Gas for Asia – Geopolitical Implications of Asia's Rising Demand*, NBR Special Report#41 (September 2012):7-18; William T. Tow, "Strategic Dimensions of Energy Competition in Asia," in *Energy Security in Asia*, ed. Michael Wesley (New York: Routledge, 2007):161-173; Flynt Leverett and Jeffrey Bader, "Managing China-U.S. Energy Competition in the Middle East," *The Washington Quarterly* 29-1 (2005), 187-201; Frank Umbach, "Competing for Caspian Energy Resources: China's Energy (Foreign) Policies and the Implications for the EU's Energy Security," in *Secure Oil and Alternative Energy: The Geopolitics of Energy Paths of China and the European Union*, ed. M. Parvizi Amineh and Yang Guang (Netherlands: Brill Publishers, 2012), 75-114; and Michael May, "Energy and Security in East Asia," Asia/Pacific Research Center (January 1998), accessed 20 February 2014, http://fsi.stanford.edu/sites/default/files/Mayfront.PM.pdf.

[90] See *Resource Wars: The New Landscape of Global Conflict* (New York: Henry Holt and Company, 2001); *Blood and Oil: The Dangers and Consequences of America's Growing Dependency on Imported Petroleum* (New York: Metropolitan Books, 2004); *Rising Powers, Shrinking Planet: The New Geopolitics of Energy* (New York: Henry Holt and Company, 2008); and *The Race for What's Left: The Global Scramble for the World's Last Resources* (New York: Metropolitan Books, 2012).

remain largely descriptive.[91] These writings are invaluable and form a substantial portion of the empirical foundation for this project. This section, however, focuses on research that puts forward explanations of the levels of state intervention in the oil supply sectors of net oil importing economies, especially at the high level.

Phillip Andrews-Speed, Xuanli Liao, and Roland Dannreuther's *The Strategic Implications of China's Energy Needs* explains that China adopted a more "strategic" than "market-oriented" approach to ensure its oil supply since it became a net oil importer in the mid-1990s (up to when the study was published in 2002) because of rising oil insecurity, the "predominantly 'strategic' orientation" of multiple key energy policymaking actors without a coherent strategy, and a lack of interest groups that promote "market-driven" solutions to energy insecurity.[92] The strategic orientation in turn was boosted by a lack of understanding of how energy markets function, technical and institutional obstacles to energy sector liberalisation, and NOCs' preference for the status quo and the strategic approach. [93] Top party and government leaders, the military, relevant government departments, and NOCs are considered the key players, while provincial governments and think tanks are designated as subsidiary ones.[94]

Published in 2011, Andrews-Speed and Dannreuther's *China, Oil and Global Politics* is essentially an updated and more elaborate version of *The Strategic Implications.* The authors still try to explain China's energy policy, especially international oil policy, by examining the interactions among domestic players who were conditioned by the "wider context."[95] This context is supported by a myriad of historical, ideational, institutional, and external factors, which tend to create a path dependency and feedback effects on each other. The explanatory function is only one of the two major objectives of both studies. The other, probably more central, objective is to assess the "political and foreign policy implications" of the policy and "the challenges this potentially poses for China's integration into the international system."[96] In the latter study, this objective is realised by relating international relations theories to three possible scenarios that China's international oil policy could evolve to more conflictual situations with the West, each taking up a full-length chapter. The authors are convinced that China's core objective is still to integrate with the global

[91] Some examples of this literature include: Kang Wu *et al*, "The Asia-Pacific Energy Dilemma," in *Asia's Energy Future – Regional Dynamics and Global Implications*, ed. Kang Wu *et al*, Honolulu: East-West Center, 2007:1-14;Tanvi Madan, "India's ONGC: Balancing Different Roles, Different Goals," Joint Baker Institute/Japan Petroleum Energy Center Policy Report (March 2007); Mikkal E. Herberg, "The Rise of Asia's National Oil Companies," NBR Special Reports#14 (December 2007):1-7; and Ashok Sharma, "India and Energy Security," *Asian Affairs* 38:2 (2007):158-172.
[92] Andrews-Speed *et al*, *The Strategic Implication*, 69.
[93] Ibid., 43.
[94] Ibid., 46-47.
[95] Andrews-Speed and Dannreuther, *China, Oil and Global Politics*, 36.
[96] Ibid., ix.

economic and political systems, but at its own pace and manner, while acknowledging that the outlook for such integration is less sanguine than a decade before.[97]

Øystein Tunsjø's *Security and Profit in China's Energy Policy: Hedging Against Risk* argues that the Chinese state adopts a mix of market and strategic oil supply strategies to insure against and manage supply disruption and price volatility risks. It does so because it is uncertain which of these two strategies best enhances its energy security. He introduces the concept of "hedging" akin to the use in finance to explain China's array of oil supply measures. "Longs" are measures associated with cooperation or positive developments, such as profiting from the market or preventing crises; 'shorts' are those "tied to strategic and security considerations," such as pipelines projects.[98] As in financial management, when the economic or political costs of either type of measures become excessive, fewer of that type of measure would be adopted. Tunsjø believes Chinese NOCs are generally driven by profit motive while the government is motivated by security considerations. Therefore, Chinese international oil policy, as suggested in the title of his book, is believed to be driven by both (oil) security and profits. He also differentiates between peacetime risks and wartime threats to oil security and he believes China's energy security policy "predominately addresses peacetime risks."[99]

The first cross-economy comparative study on state intervention in oil supply is Llewelyn Hughes' *Globalizing Oil: Firms and Oil Market Governance in France, Japan, and the United States*. It explains changes in the degrees of oil market liberalisation in France, Japan, and the United States between 1980 and 2005 by the differing "demands of firms make on governments, and the incentives governments have to meet these demands."[100] Oil firms with different characteristics had different preferences on host economies' domestic oil market governance against the background of the emergence of the international oil markets. These characteristics were in turn shaped by the industrial compacts negotiated between the firms and the government in an earlier period. The restructuring of the international oil markets in the 1980s is pinpointed as the critical juncture that shaped the current diverging degrees of liberalisation in all three subsequent cases.[101]

Jeffrey D. Wilson's *Northeast Asian Resource Security Strategies and International Resource Politics in Asia* does not try to explain the difference in the level of state intervention, but what is instead seen as more or less the same "mercantilist" resource, including oil, security strategies employed by China, Japan, and South Korea over the last

[97] Ibid., 169-190, 2-3.
[98] Øystein Tunsjø, *Security and Profit in China's Energy Policy*, 27.
[99] Tunsjø, *Security and Profit in China's Energy Policy*, 223.
[100] Llewelyn Hughes' *Globalizing Oil*, 16.
[101] Ibid., 68 and 41.

decade. Wilson's study sees these economies as all adopting a high level of state intervention to ensure oil supply security. The manifestations of this strategy include such measures as investments in "equity resources" by national firms, providing financial and regulatory assistance to national firms, and "resource diplomacy."[102] In the context of oil, these would all be strategic supply measures as conceptualised in this project. While China's approach is characterised as the most aggressive, all three countries are seen as motivated by "a deep scepticism in the liberal belief that international markets provide the best guarantee of resource security."[103] Once triggered by this sense of insecurity, the process of "competitive policy emulation" took over, resulting in the region-wide adoption of this mercantilist strategy.[104]

"Oil & State Capitalism – Government-Firm Coopetition in China and India," endeavours to understand who exactly are driving China and India's overseas hydrocarbon investments and what motivate them.[105] In their effort to untangle this puzzle, Jonas Meckling, Bo Kong, and Tanvi Madan adopt the concept of the "polymorphous state" to separate the state from the NOCs - those actually execute and are directly impacted by the investments.[106] The study explains variations in the extent of Chinese and Indian NOC internationalisation by the combined effects of two processes: privatisation/marketisation of these NOCs, and NOC governance reforms in overseas investments.[107]

Privatisation is said to inject NOCs with the entrepreneurial spirit to engage in overseas investments,[108] and the specifics of the governance reform in each country resulted in differences in procedural rules and the bureaucratic capacity of the state to monitor and control its NOCs.[109] The state is conceptualised as playing the roles of both resource supplier, thus providing different levels of cooperation, and veto player, thus creating a certain level of competition to NOCs in the two causal processes. [110] The study concludes that the larger internationalisation scale of Chinese NOCs is due to the Chinese state simultaneously providing high cooperation or being a strong resource supplier and low competition or being a weak veto player to its NOCs[111] The almost reverse positions of the Indian state in these

[102] Wilson, "Northeast Asian Resource Security Strategies and International Resource Politics in Asia," *Asian Studies Review* 38:1 (2014): 17.
[103] Ibid, 17.
[104] Ibid.
[105] Jonas Meckling, Bo Kong, and Tanvi Madan, "Oil State Capitalism – Government-Firm Coopetition in China and India," *Review of International Political Economy* 22-6 (2015), 1159-1187.
[106] Ibid., 1164, 1181.
[107] Ibid., 1164-1165.
[108] Ibid., 1162-1164.
[109] Ibid., 1166-1167.
[110] Ibid., 1162-1163.
[111] Ibid., 1177-1180.

two roles (moderate resource supplier and stronger veto player) is offered to explain Indian NOCs' relatively smaller internationalisation scale.[112]

5.3 Contribution

The literature review on the politics of oil above suggests that this thesis has a broader scope than most existing studies on the subject. This study puts forward an explicit analytical framework to explain variations in the levels of intervention in the oil supply across importing economies, as well as within them over different periods. This is not always found in the existing literature.

In the preliminary cross-economy study in Chapter Three, two major strategic oil supply measures are uniformly examined across nine net oil importing economies stretching from East to Southeast and then to South Asia. This is intended to expand our empirical understanding of oil supply strategies of importing states beyond OECD countries. Data of these economies are collected at 2013 and 2003 to evaluate the cross-temporal dimension of the proposed model. Each data collection point represents roughly a decade of high and low oil prices respectively when the international oil markets have already been well established. The two in-depth paired comparisons presented in Chapter Four and the single-economy investigation presented in Chapter Five of this thesis provide both quantitative and qualitative data on India, Thailand, China, and Taiwan's oil sectors. The chapters also analyse the strategic oil supply measures these government adopted, especially in the decade preceding 2013.

Tunsjø puts forward a clear analytical framework – that of hedging between risks associated with the market and the strategic approaches to energy/oil security. He suggests that states other than China may also have used the hedging strategy to manage their energy security risks, but investigating that possibility is beyond the scope of his study. Putting aside its scenario-projection and implication section, Andrews-Speed and Dannreuther's study loosely adopts a historical and institutionalist approach, with the emphases on the role of ideas and perception, contingency, and feedback effects.

None of the single-country studies reviewed here explicitly explains the temporal variations in the levels of state intervention within the economy studied. The two studies by Andrews-Speed *et al* suggest such variations by stressing the evolving and contingent nature of China's oil policy. The earlier study, however, only covers less than a decade of that policy since China became a net oil importing country, and so there may not be, in any case, enough changes of the factors involved. The latter study covers a period just two years shorter than that examined in this thesis. The authors note that they were surprised by the

[112] Ibid.

simultaneous fast economic growth of China and the steep rise in oil price between 2002 and 2011, the magnitude of the effect of the former on the latter, and the resulting increased "global salience" of energy security. They insinuate China's oil supply strategy has been less coherent and less market-driven than they anticipated because of greater constraints from domestic interest groups.

Tunsjø's study is vague in teasing out any temporal variations of the overall mixes of the strategic and market approaches. For example, Tunsjø says China scaled back diplomatic support to Sudan around 2007 when the political costs of its oil diplomacy towards the country became too high.[113] He focuses the attention on the "hedging" dimension of the incident – reducing the magnitude of the strategic approach or the "short" position - not the temporal variation in the level of strategic measure adopted. Hughes' is the only study of which I am aware that explicitly examines both temporal and cross-country differences in oil market governance with a clear analytical framework – that of "historical institutionalism."

The vulnerability-interaction model proposes four major explanatory variables. This means most explanations put forward in the existing literature are not seen as truly alternative causes to state intervention in oil supply. Instead, some of them are at least partially factored in the IV and ITVs of the proposed model. The simultaneous fast economic growth and the steep rise in oil price between 2002 and 2011 in China, and the bargaining strength of domestic interest groups (mostly NOCs) - the "neglected" factors mentioned in Andrews-Speed and Dannreuther's study - for example, are incorporated into the vulnerability-interaction model. The former may be summarised as changes in OV. The latter is factored in two of the four explanatory variables: as a major component of the overall strength of private capital in the economy and as a securitising agent impacting on decision-makers' trust in oil markets. If all other factors remain constant, therefore, both a higher OV and the presence of coherent NOCs would result in the adoption of a higher level of strategic oil supply measures according to this study's model. This appears to be consistent with the observations made by Andrews-Speed and Dannreuther in the case of China during the period of their study. Some exceptions are Wilson's "competitive policy emulation," and Tunsjø's financial-management-style hedging.

This brings up the issue of how unitary and autonomous the state is conceptualised in the existing literature and in this project. Wilson appears to be on the most unitary and autonomous end of the spectrum, from which mercantilist policies can be pursued. Hughes would be on the other end of the spectrum. State/polity actions or inactions are seen as resulting from negotiations with private firms, which in turn were conditioned by the

[113] Tunsjø, *Security and Profit in China's Energy Policy*, 17.

structure or restructuring of the international oil markets. The fact that the vulnerability-interaction model consists of one IV and three ITVs means the state's autonomy is understood as rather circumscribed. Unlike Andrew-Speeds *et al*, Tunsjø, and Meckling *et al*, who all highlight the divergence between the state and its NOCs, this thesis does not differentiate the actions taken by them. At the same time, the state/polity is not conceptualised to be as coherent as being able to conscientiously carry out a hedging oil supply management strategy as Tunsjø asserts. It may, of course, scale back or even scrap some measures *after* it becomes apparent that they have generated undesirable consequences for the polity.

On the other hand, the applicability of industrial compacts between the government and private oil firms as the central explanatory variable in Hughes' studies is questionable within the scope of this thesis. While IOCs dominated the relatively small oil sectors of some Asian economies during the colonial days and the early years after independence, NOCs had already been established and in some cases entrenched in many of these economies by the time open trading in the international oil markets began in the 1980s.

Meckling *et al*'s study has a narrow focus – trying to understand the motivation and the scale of NOC internationalisation only. That provides excellent insights into the bifurcation of the state and its NOCs and the dynamics impacting NOC internationalisation in China and India. It is not totally clear, however, if or how the processes described would ultimately affect the overall extent of state intervention in their economies' oil supply.

I argue that the resource supplier concept in Meckling *et al*'s study may be loosely understood as the implementation capability ITV in the vulnerability-interaction model, regardless of how that supply of resources was initiated. If we accept that premise as "a close enough" analogy, the prediction of the vulnerability-interaction model actually corresponds to Meckling *et al*'s conclusion: greater "cooperation" results in larger scale internationalisation. The wider scope covered by the model proposed in this thesis precludes a close equivalent of the veto player concept which specifically refers to the results of NOC governance reforms only.

A pre-requisite of specifically explaining the cross-temporal and the cross-economy variations of strategic oil supply measures adopted is to devise a generally uniform and systematic way of comparing the different levels of them. Among the literature reviewed, Hughes' is the only study that provides such an indicator. As detailed in Chapter Three, the plausibility probe refines one of the two measures used in Hughes' study. In spite of this and the shared goal of explaining cross-temporal and cross-economy variations of the degrees of state intervention in oil supply with Hughes' study, this study theorises perception and ideas as an important intervening variable to the more materialist variables.

In fact, embedded in the ITV of trust in the oil markets, this ideational variable is hypothesised as an *a priori* necessary condition for the adoption of a high level of strategic oil supply measures.

In this regard, Andrews-Speed and Dannreuther's explanations of China's energy/oil policy are closer to the essence of the vulnerability-interaction model. This thesis, however, formalises the interaction between these two types of variables to facilitate comparison and testing of hypotheses. In addition, two elements among the variables of this study's model also mimic the feedback loop and path dependency ideas in their study. First, the presence and coherence of NOCs is theorised as having an impact on trust and hence ultimately on the level of strategic oil supply measured adopted. At the same time, their presence and coherence directly determines the level of strategic oil supply measures. Whether they are present or coherent, therefore, the impact is magnified. Moreover, once they were created, their impact on the DV would be hard to be eliminated. Second, in the scenario where domestic private capital is weaker than both international capital and the state or SOEs (scenario 3), the state/polity's orientation, meaning the economy's OV and level of trust in the oil markets, would become more salient. All these elements are organised in a way that facilitates comparison, both across economies and over time. Ultimately, this may be the biggest "innovation" of the vulnerability-interaction model.

6. Constructivist Approach to State Intervention in Oil Supply?

The vulnerability-interaction model presented in this chapter emphasises the effect of interaction among four explanatory variables on the level of state intervention in the oil supply in net oil importing economies. Two of these variables, trust in oil markets and strength of private capital, incorporate some non-material elements in their formulation. For this reason, this section tries to clarify the extent the model can be viewed as having a constructivist approach to state intervention in oil supply. The discussions below suggest that the model in its entirety, as currently conceptualised, situates closer to the conventional realist than the constructivist end of the theoretical spectrum.

The different strands of the constructivist approach to international relations converge on the following commonalities:[114] They see agents and structures as mutually constitutive; the consequences of anarchy as socially constructed instead of preordained; state identities and interests as variables, not as fixed givens; and both material and

[114] See, for example, John Kurt Jacobsen, "Duelling Constructivisms: A Post-Mortem on the Ideas Debate in Mainstream IR/IPE," *Review of International Studies*, 29-1 (January 2003): 39-60. Ted Hopf groups these strands under the banners of "critical constructivism" and "conventional constructivism." See "The Promise of Constructivism in International Relations Theory," *International Security*, 23-1 (Summer, 1998): 171-200.

discursive capabilities as sources of power.[115] These four major features of the approach are used to focus the discussion on how constructivist the vulnerability-interaction model is.

Mutually Constitutive Agents and Structure. The most important agents examined in the proposed model are net oil importing economies as personified by national-level decision-makers in their economies' oil supply, and more broadly, economic policymaking. The most pertinent structures include the international oil market, the power distribution in the international system, and existing domestic oil market governances during the period studied. The independent variable of OV as currently conceptualised offers only little to moderate room for mutual constitution between these agents and structures. It is in the concept of market risks that very large net oil economies would have noticeable impact on the international oil market, and more indirectly and less certainly, on the overall power distribution in the international system. These economies would be vulnerable to market risks when global oil supply is tight but also wield market shaping power when there is an oil glut.

At the domestic level of analysis, the agents of large private oil firms and NCOs and the structures of both the domestic oil markets and the national governments of economies generally have more mutual influence on each other's behaviour than at the international level. The explanatory factors of decision-makers' trust in their domestic oil markets and private capital strength in their economies are predicated on this domestic level mutual constitution. Agent-structure mutual constitution does not directly concern the variable of OV or implementation capability.

Socially Constructed Consequences of Anarchy. The price-setting mechanism of the international oil market is "governed" by demand and supply dynamics, not anarchy. Just as many other markets in the real world, however, it is far from having "textbook" perfect market conditions, such as being populated by a large number of buyers and sellers of similar sizes with perfect information. Besides, the current international oil market has been adopted as the primary mode of exchange of oil across national borders relatively recently and is still evolving. The vulnerability-international model argues that more opaque modes of international oil exchange that were more directly tied to the power distribution in the international system, therefore, still cast a shadow over decision-makers' trust in the current international oil market. This doubt could be exploited and magnified with effective securitisation of oil supply – a concept closely associated with the constructivist approach.[116]

Unlike the constructivist approach, however, the proposed model sees the impact anarchy has on decision-makers' trust in the international oil market as springing from only

[115] Hopf, ibid, 185.
[116] Balzacq, "Constructivism and securitization studies," 56 – 57.

one understanding of anarchy – the realist or Hobbesian understanding.[117] Their trust in the international market is predicated on the quality of their relationship with the presumed system leader, and hence how acute the political entity's competition for survival or leadership with this "hegemon" is. Yet, this understanding of the consequence of anarchy is not seen as preordained as realism postulates. Indeed, it has been tinkered by rule-based and transparent regimes as postulated by neoliberalist theorists, especially in economic domains. The vulnerability-interaction model is formulated with the observation that a widely shared understanding of anarchy that is vastly different than the realistic one, has not emerged and the assumption that it would not emerge in the near future in the Asia Pacific. The nature of anarchy does not really concern the other explanatory factors.

Variable State Identities and Interests. Following the reasoning of the mutual constitution between agents and structures and the power of discourse, the constructivist approach sees that states may have multiple and changing identities and hence interests and behaviour that are associated with the various identities through intersubjectivity. Overall, the vulnerability-interaction model assigns relatively fixed identities and interests to political entities regarding their oil supply policies. A political entity is conceptualised to identify itself as a net oil importing or net exporting economy largely based on the material factor of whether it produces more oil than it consumes during a given time period.[118] The interests generated from the identity of being a net importing economy are also largely the same: to secure the most affordable, efficient, and stable supply of oil to the economy. More perceptual elements, however, are involved in determining the best course of actions to safeguard these interests.

The proposed model suggests decision-makers' different understandings of the best combination of market and non-market measures to realize the same interest and identity as net oil importing economies *in addition to* individual economies' implementation capability and OV translate into the different levels of strategic oil supply measures an economy adopts at any given time. These understandings may be skewed by securitisation of oil supply to lower decision-makers' trust in the effectiveness and/or fairness of oil markets, but they would not be totally divorced from the material, institutional, and historical realities of the

[117] Alexander Wendt, considered a "standard bearer" of conventional constructivism, for example, suggests that actors (states) may understand anarchy as Hobbesian, Lockean, or Kantian depending on how they see themselves and others in the international system. These different approaches to anarchy would generate very different consequences even when the international system remains anarchic. See *Social Theory of International Politics* (Cambridge University Press Virtual Publishing, 2003), 246-312.

[118] As discussed in Chapters Three and Six in this thesis, a perceptual lag to this material rule is likely to linger in cases when an economy has recently transitioned from a net producer to a net consumer, as in the case of Indonesia during the period studied.

economies. This leads to the assessment of how much power the vulnerability-interaction model assigns to discourse and through which type of securitisation.

Sources of Power. The constructivists approach sees material and discursive capabilities as intertwining sources of power, more so than the realist school of thoughts.[119] This relative emphasis on the power of discourse contributed to the conceptualisation of securitization theory, first developed by a group of scholars commonly referred to as the Copenhagen School (CS).[120] According to this often cited formulation of securitization theory, an issue may be securitized as an existential threat that calls for extraordinary measures simply by the "speech act" of proclaiming and presenting it as such.[121] As discussed in Section 3.2 earlier in this chapter, the vulnerability-interaction model proposed in this study, however, has adopted a more recently developed approach to securitisation theory put forward by Balzacq. This approach emphasises the impact of external contexts and the status of securitising agent(s) vis-à-vis the targeted audience on successful securitisation, in addition to the performative act of speech. This approach is one of the more "practice-based" strands versus the more "linguistic" approach to securitisation as represented by the original CS formulation.[122]

For the explanatory factor of trust in oil markets, therefore, the model proposed in this thesis takes a largely constructivist approach that discursive and material capabilities are equally important sources of power. This combined power is channelled through securitisation to cause different levels of trust among decision-makers as the success of this process is contingent as much on external contexts as the power relations between agents and audience of securitisation, as the speech act of uttering the supposed threat itself. Securitisation theory, particularly the more practice-based strand adopted in this thesis, is suited to such an application as it

> … claims that the intersubjective representation of reality (constructivitism about facts) is not necessarily incompatible with the possibility that some

[119] There are important exceptions to mainstream approaches' "neglect" to ideational or perceptual variables to international relations. Examples include Robert Jervis' study on the role of perception in decision-making in *Perception and Misperception in International Politics* (Princeton, NJ: Princeton University Press, 2015); Joseph Nye's examination of soft power in *Soft Power: The Means to Success in World Politics* (New York: Public Affairs, 2004); and Judith Goldstein and Robert Keohane's discussion and compilation of works on how ideas shape foreign policymaking in the volume they edited: *Ideas and Foreign Policy* (Ithaca: Cornell University Press, 1993).

[120] Securitization theory incorporates elements of realism and poststructuralism as well as constructivism and has developed into a number of strands, even if "linkages between securitization theory and other theoretical enterprises remain largely under-studied and under-specified." Thierry Balzacq, Sarah Léonard, and Jan Ruzicka, "'Securitization' revisited: theory and cases," *International Relations*, 30-4 (2016), 518.

[121] Ole Wæver, "Securitization and Desecuritization," *On Security*, ed. Ronnie Lipschutz. (New York: Columbia University Press, 1995), 46–86.

[122] For a discussion of the categorization and its limit of various strands of securitization theory, see Balzacq *et al* "Securitization revisited" 498-499.

> features of the world, independent from people and their beliefs about those, are capable of explaining why a community holds that something is a threat (objectivism about rational explanations) … [and it] relate[s] language and mind to the impact of the external world on regulating the content of the two.[123]

Overall, the vulnerability-interaction model shares more features with the realist than the constructivist approach. Not much mutual constitution is conceptualised to take place between individual net oil importing economies (agents) and the international oil market or the international system at large (structure). In the case of the few very large net oil importing economies, the influence they have on the structure is understood as materialist rather than ideational in origin. There would be more mutual constitution at the domestic level, but the oil supply strategy of net oil importing economies are usually more externally-oriented.

The proposed model also assumes net oil importing economies as having similar realist understanding of the consequences of anarchy as well as the same interests and identities in formulating their oil supply strategies. Decision-makers' trust in the oil markets' capability in ensuring their economies' oil supply security is the only explanatory variable that has a significant perceptual or ideational element factored in it. Discourse is conceptualised to manifest its power through a process more akin to the pragmatic than the linguistic approach of securitisation theory put forward by the CS to determine the ultimate trust level.

The empirical chapters of this study, previewed in the next section, suggest that this variable played a critical role in eventuating the level of strategic oil supply measures Asian net oil importing economies adopted during the period studied. Still, the vulnerability-interaction model takes a more "fleshed-out" or "realistic" realist approach à la Jervis and Goldstein and Keohane than an outright constructivist approach with its preponderance of materialist variables and its presumption of the mostly realist understanding of anarchy among the economies examined.[124]

7. Empirical Strategy

This section maps out the empirical strategy to test the validity of the four hypotheses generated by the vulnerability-interaction model. The model is largely deductive and has not been tested with empirical cases. This thesis will, therefore, first conduct a

[123] *Ibid*, 519.
[124] See footnote 119 above. Jervis, *Perception and Misperception in International Politics* and Goldstein and Keohane, "Ideas and Foreign Policy: An Analytical Framework," in *Ideas and Foreign Policy*, 3-13.

plausibility probe to verify its plausibility with a relatively larger number of cases, but less in-depth data. This helps to determine if "more intensive and laborious testing is warranted."[125] Plausibility probe is one of the six theory-building case study research objectives George and Bennett identify.[126] Given the Asia-Pacific focus of this study as discussed in Chapter One, the first step towards testing the model is to determine economies to include in the plausibility probe in Chapter Three.

What constitutes a "region" has always been a contested concept and what constitutes the Asia-Pacific is no exception.[127] This thesis takes a pragmatic approach in case selection by trying to include as many net oil importing economies as possible in the plausibility probe where relatively reliable data on energy and oil production, consumption, and supply are available. The *BP Statistical Review of World Energy*, published annually during the two decades covered by this project and beyond, therefore, becomes the starting point. Data of 16 economies are grouped under "Asia Pacific" in the June 2014 edition of the review, which covers data up to year 2013.[128] Of the 16, Malaysia and Vietnam are eliminated because their status as net oil importers as of 2013 is ambiguous.[129] Bangladesh, Pakistan, and China Hong Kong SAR, are eliminated due to the relative lack of data upon initial research. Finally, Australia and New Zealand are also excluded. These two economies are more geographically remote and distinct from the rest of the group. Besides, although Australia is a net oil importer, it is also a net energy exporter.[130] This may give decision-makers a different perspective on oil supply security issues. In the end, nine economies, which are what remain from the original 16 after these adjustments are made, are sufficiently large scale for this project to assess.

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[125] George and Bennett, 75.

[126] The other five objectives they identify are: atheoretical/configurative idiographic, disciplined configurative, heuristic, theory-testing, and "building block" studies of particular types or subtypes. See *Case Studies and Theory Development in the Social Sciences*, 74-75.

[127] For discussions of the many ways the concept of Asia and Asia-Pacific may be defined and what these different definitions imply, see David Shambaugh, "International Relations in Asia," in *International Relations of Asia*, ed. David Shambaugh and Michael Yahuda (Lanham, MD: Rowman & Littlefield, 2014), Kindle Edition; and Arif Dirlik, "The Asia-Pacific Idea: Reality and Representation in the Invention of a Regional Structure," *Journal of World History*, 3-1 (Spring 1992): 55-79.

[128] *BP Statistical Review of World Energy*, June 2014, 9. The 16 economies are: Australia, Bangladesh, China, China Hong Kong SAR, India, Indonesia, Japan, Malaysia, New Zealand, Pakistan, Philippines, Singapore, South Korea, Taiwan, Thailand, and Vietnam.

[129] Cecilia Kok, "Govt reveals M'sia net importer of crude oil, petroleum products since 2014," *The Star*, 21 January 2015, accessed 11 August 2015, http://www.thestar.com.my/Business/Business-News/2015/01/21/Clearing-the-air-Treasury-sec-gen-Malaysia-net-importer-of-crude-oil-petroleum-products-since-2014/?style=biz.. Also see "Overview" U.S. Energy Information Agency webpage on Vietnam, last updated in November 2014, accessed 20 August 2015, http://www.eia.gov/beta/international/analysis.cfm?iso=VNM.

[130] BP Statistical Review of World Energy, June 2014, 8-9. Also see "Key Facts – Australia's Energy Sector," Bureau of Resources and Energy Economics, Australian Government Department of Resources, 2012.

The method of structured and focused comparison is used to make pairwise comparisons among the chosen nine economies in the plausibility probe to examine the validity of H1 to H2: China, India, Indonesia, Japan, the Philippines, Singapore, South Korea, Taiwan, and Thailand. Year 2013 data are used to test the cross-economy dimension of these two hypotheses. The same data are compared with year 2003 data of each economy to test the cross-temporal dimension of the hypotheses. These two years each presents roughly a decade of high oil prices (2004-2013) and a decade of low oil prices (1994 – 2003) that cover the entire period of this study.

Nine "within-case comparisons" are made with the levels of the explanatory variables in these two years to see if they are congruent with the levels of the DV as predicted by H1 and H2. According to George and Bennett, "there is a growing consensus that the strongest means of drawing inferences from case studies is the use of a combination of within-case analysis and cross-case comparisons within a single study."[131] Due to time and length restraints, however, the cross-temporal dimension of the vulnerability-interaction model is investigated only in the plausibility probe.

Structured and focused comparison involves finding answers to standardised questions pertinent to the research objective.[132] Two major strategic oil supply measures are used to comprise an indicator to uniformly assess the levels of these measured adopted, the DV, in each of the nine cases with 2013 and 2003 data. Two market and two supply risks make up another indicator for OV, the IV of the vulnerability-interaction model. In the plausibility probe, only the historical-institutional source of the overall private capital strength is investigated. Two "off-the-shelf" indicators are used to evaluate the degrees of overall economic freedom and openness of the cases. The exact sources and methods of these indicators are discussed in the Chapter Three, but it suffices to say here that the creation of these indicators amounts to answering the same questions in the most standardised way possible.

All the data are reviewed and cross-compared to evaluate the *prima facie* validity of H1 to H4 and to choose the best cases for further investigation. H2 means that candidates for further investigations of the hypothesis would fall into a loose definition of the most similar cases - all explanatory factors of interest being similar except the theorised ones but with different outcomes (DV).[133]

Once the best candidates are chosen from the plausibility probe, the same structured and focused comparison method is used to conduct more in-depth examination of

[131] George and Bennett, 18.
[132] George and Bennett, 70.
[133] Jason Seawright and John Gerring, "Case Selection Techniques in Case Study Research," *Political Research Quarterly* 61-2 (June 2008): 298-304.

the cross-economy validity of H1 and H2. Measures and evidence that are more unique to the cases and are difficult to quantify, but are consistent with the logic of the model are taken into consideration in these comparisons. These include speeches of decision-makers and stakeholders concerned, information on government ministry and NOC websites, policy directives and guidelines, media reports, and existing scholarly and policy studies. Simple content analyses of the annual reports of the relevant NOCs in the relevant years are conducted to investigate the NOCs' securitising effort or lack thereof.

Before H3 and H4 or the second layer of the vulnerability-interaction model can be tested, economies that have adopted a high level of strategic oil supply measures must first be located. Data generated in the plausibility probe serve as the basis for the search. This is justified as even casual observers would agree that economies that have adopted a high level of strategic supply measures among a cohort of nine Asian net oil importing economies are likely to be qualified as adopting a high level among any cohort of net oil importing economies in the world. Once a case is found to have a high DV in the plausibility probe, the levels of all its explanatory variable are examined to see if they correspond to those specified in either H3 or H4.

The plausibility probe located China with 2013 data as having the exact configuration as stipulated by H4. None of the cases, however, matches the configuration of H3. Among the three closest contenders, Taiwan is chosen for an in-depth case study to investigate the validity of H3. Since one of the purposes of this study is to "probe new explanation for Y,"[134] the pathway leading to the adoption of a high level of strategic oil supply measures, Taiwan is examined as a deviant case study.

No further investigation is conducted on China for H4 since it is already compared with India for the in-depth study of H2 in Chapter Four. As the literature review above suggests, many aspects of China's oil supply strategy in the last two decades have been examined within existing relevant literature, even if they apply a different analytical framework.

This concludes the empirical strategy to test the validity of the vulnerability-interaction established. The next chapter will present the plausibility probe of the entire model.

[134] Ibid., 297.

Chapter Three
Plausibility Probe of Vulnerability-Interaction Model

1. Introduction

This thesis proposes the vulnerability-interaction model to explain the puzzling phenomenon of net oil importing states' continued but different levels of intervention in how oil is supplied to their economies. In this chapter, I measure the key independent (IV), intervening (ITV), and dependent variables (DV) for nine Asian net oil importing economies, and use these measures to probe the plausibility of the layers and dimensions of the model.

As noted in Chapter Two, the first layer is designed to examine what caused Asian net oil economies to adopt different levels of strategic oil supply measures from each other, and across time, within the period of 1994 to 2013. The second layer of the model explores factors driving some of these economies to adopt a high level of such measures during the same period.

H1 states that if the levels of all four explanatory factors are similar in two cases, the value of their DV should be similar. H2 states that if the levels of three of these factors are similar in two cases, their DV levels should be congruent with the result caused by the difference in their fourth factor as predicted by the model. These hypotheses are tested using two empirical strategies. First, they are tested for their cross-case validity with pairwise comparisons among the nine economies of China, India, Indonesia, Japan, the Philippines, Singapore, South Korea, Taiwan, and Thailand with 2013 data. Second, these two hypotheses are subsequently tested for their cross-temporal validity with the same nine economies. Each of the nine within-case studies compare the 2003 data and the 2013 data longitudinally, representing a decade of relatively low and high oil prices respectively.

This enables me to achieve two goals. First, the testings of H1 and H2 probe the explanatory power of my model. Second, they assist in my case selection strategy, by helping me identify which economies have adopted a high level of strategic oil supply measures. These cases are then used to gauge the validity of H3 and H4. Then the best cases to conduct in-depth studies on the cross-case dimension of H1 and H2 and on H3 are identified.

The following section in this chapter presents data to facilitate cross-case comparisons related to H1 and H2. Section 3 presents the preliminary results of the cross-case study in Section 2, which provide good support to the vulnerability-interaction model. Section 4 presents nine within-case studies related to the cross-temporal dimension of H1 and H2. Section 5 examines the overall validity of all the dimensions and layers of the model

and justifies the selection of cases for more in-depth investigation of the model in Chapters Four and Five. Section 6 concludes with discussions on how the vulnerability-interaction model compares with applicable alternative theories and initial observations gleaned from this plausibility probe.

2. Measuring Key Variables, Testing H1 and H2 Through Cross-Case Comparison

This section weighs the same set of questions of each of the nine Asian net oil importing economies with 2013 data. Each of the following questions probes a key variable of the vulnerability-interaction model and thus helps determining the cross-case validity of H1 and H2.[1]

The questions asked of each case are:

1. What was the level of strategic oil supply measures adopted by the state in 2013? (i.e. measure DV)
2. What was the economy's oil vulnerability (OV) in 2013? (i.e. measure IV)
3. What was the strength of the private capital in the economy, in the form of its degree of overall economic freedom and openness in 2013? (i.e. measure ITV1)
4. What was the decision-makers' level of trust that oil markets can adequately provide oil security? (i.e. measure ITV2)
5. In 2013 what was the state's overall capability to implement strategic oil supply measures? (i.e. measure ITV3)

Each of these questions aims at measuring the level of one variable (DV, IV, and ITVs respectively) within the overall model. Sections 2.1 to 2.5 below justify and apply a series of measures that are used for variables in the order of the questions listed above.[2] Then preliminary tests of hypotheses 1 to 4 developed in Chapter Two are carried out.

The year 2013 is chosen as a critical benchmark because it ended a decade of mostly rising oil prices.[3] Many strategic oil supply measures, including those used to gauge

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[1] George and Bennett describe the essence of structured, focused comparisons as being uniform and theory-centric. 68.

[2] This study uses the "indicator approach" to provide preliminary answers to the first three questions. The indicator approach tries to operationalise and measure the latent variables or the "constructs" representing the real phenomena of interest. The sections providing answers to the last two questions take an approach closer to what Gary Goertz and James Mahoney call the "semantic approach." Goertz and Mahoney, *A Tale of Two Cultures: Qualitative and Quantitative Research in the Social Sciences* (Princeton: Princeton University Press, 2012), 127-128. For a discussion of latent variables, see Kenneth A. Bollen, "Latent Variables in Psychology and the Social Sciences," *Annual Review of Psychology* (2002) 53, 607-608.

[3] For graphs showing the dramatic drop of the prices of both the Brent crude and the West Texas Intermediate crude in 2014, especially in the fourth quarter, see "Crude oil prices down sharply in fourth quarter of 2014," U.S. EIA website, assessed 1 April 2016, https://www.eia.gov/todayinenergy/detail.cfm?id=19451. For an annotated graph showing the history of crude oil prices, including the twenty-year period covered in this study, see "An Annotated

the measures adopted in this project, have a relatively long lead time. Therefore, data for 2013 is an appropriate representation of oil supply security decision-making during a period of high oil price.

2.1 Dependent Variable: Strategic Oil Supply Indicator

The strategic oil supply indicator has been created here to assess the level of strategic oil supply measures adopted by the state in question. Two measures make up this composite indicator: 1. percentage of government control of the economy's crude oil supply; and 2. size of the economy's strategic petroleum reserves (SPR).

2.1.1 Justification

A composite indicator is used in this study to allow for the consideration of diverse manifestations of the key concept to be measured: state intervention in oil supply. Two measures are chosen in this plausibility probe because both are relatively easy to quantify and normalise, and are widely adopted in the Asia-Pacific region.

The most common way for a state to control the crude oil supply to its economy is through control of its NOC(s) by holding shares of it. It may be true that some NOCs are sometimes driven more by profit-seeking than ensuring their host countries' oil security since most NOCs are theoretically responsible for balancing their own finances.[4] Nonetheless, NOCs are still rivals to private oil firms often operating in the same country, which are unlikely to have the same level of access to policymakers. In fact, senior managers and board of directors of some NOCs also formally or informally help formulate the country's oil supply policies. SPRs and oil stockpiling of NOCs are less obviously market-displacing. The drawdown procedures of some countries' SPR, such as those of the United States, appear to be mostly market-conforming.[5] The adoption of these two strategic oil supply measures, however, does reflect a certain degree of state intervention oil markets. It is argued here that a composite indicator resulting from these measures captures different forms of state intervention in oil supply in different economies.

An alternative measure is *oil diplomacy* which is defined as "using preferential and politically-negotiated relationships" in the hope of increasing the oil supply security of

History of Oil Prices Since 1981," 20 December 2014, Business Insider Australia website, assessed 1 April 2016, http://www.businessinsider.com.au/annotated-history-crude-oil-prices-since-1861-2014-12?r=US&IR=T.

[4] See, for example, Valérie Marcel and John V. Mitchell, *Oil Titans* (Baltimore: Brookings Institution Press, 2006), 190-200; Erica S. Downs, "Who's Afraid of China's Oil Companies?" in *Energy Security: Economics, Politics, Strategies and Implications*, ed. Carlos Pascual and Jonathan Elkind (Baltimore: Brookings Institution Press, 2010), 77-79.

[5] See Anthony Andrews and Robert Pirog, "The Strategic Petroleum Reserve: Authorization, Operation, and Drawdown Policy," CRS Report for Congress, June 18, 2013, accessed 20 August 2014, https://www.fas.org/sgp/crs/misc/R42460.pdf.

the initiating state.[6] Data on how many incidents of such policy actually took place and when is scarce, however. In addition, simply tallying up incidents of oil diplomacy manoeuvres can only measure their frequency but not "magnitude." *Overseas equity oil exploration and production* (E&P) projects by NOCs is a second potential measure. Some studies point out that NOCs of Asian net oil importing economies engaging in these projects are motivated by profits, not geopolitical or strategic concerns.[7] Regardless of the motives of these pursuits, they still fall within the definition of strategic oil supply measures in this study.

2.1.2 Component 1: Government Control of Crude Oil Supply

The first component of the strategic oil supply indicator is the percentage of state control of crude oil supplied to an economy. This analysis considers a government as controlling a particular amount of crude oil if that amount is developed or procured by a company in which the state has majority ownership. Alternatively, crude oil is developed by an oil E&P project the government has funded directly or indirectly by guaranteeing the loan for its financing. The first of these measures appears to be the most market-displacing of strategic oil supply measures except for military interventions. The second one is slightly less distorting as private oil firms, instead of NOCs, are the instruments that actually bring in the oil.[8]

The easiest cases to determine this percentage are economies not having any NOCs nor funded oil E&P projects. Singapore was the only case-study economy reviewed here that did not have a NOC of any form in 2013, nor did it fund or guarantee funds to such projects by private oil companies as in Japan.[9] The Philippines does have a Philippine

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[6] This definition is adapted from the definition of "resource diplomacy" used in Jeffrey D. Wilson, "Northeast Asian Resource Security Strategies and International Resource Politics in Asia," *Asian Studies Review* (2014) 38:1, 24.

[7] See for example, Julie Jiang and Jonathan Sinton, *Overseas Investments by Chinese National Oil Companies: Assessing the Drivers and Impacts - Information Paper Prepared for the Standing Group for Global Energy Dialogue of the IEA*, February 2011; Erica S. Downs, "The Fact and Fiction of Sino-African Energy Relations," *China Security*, No. 3 (Summer 2007), 42-68.

[8] In compiling the percentage of government control, however, this slight difference in of the degrees of market-distortion is not differentiated in this indicator.

[9] Despite its NOC-sounding name, the Singapore Petroleum Company (or more commonly known as SPC) was no longer owned by the government of Singapore in the decade leading to 2013. Instead, its 45% shareholder is PetroChina, an oil firm majority-owned by the largest Chinese NOC, China National Petroleum Corporation (CNPC). See "PetroChina Acquires Keppel's Entire Stake in Singapore Petroleum Company," accessed 19 August 2015, http://www.petrochina.com.cn/ptr/xwxx/201404/b5b2d5b3773c4fe49d06294928a0c366.shtml. It should also be noted that oil produced by companies that sovereign wealth funds invested in are not counted in this first component as typically investment decisions of these funds are not made by national decision-makers. Singapore's sovereign wealth fund Temasek did and does invest in upstream oil firms, but "[u]nder Singapore's Constitution and laws, neither the President of the Republic of Singapore nor the Singapore Minister for Finance, our shareholder, is involved in our investment, divestment or other business decisions," "Corporate Governance," Temasek, accessed 20 September 2015,

National Oil Company (PNOC), but it did not produce or procure any crude oil for the country in 2013.[10] Oil exploration service contracts the Philippine government signed with E&P companies to develop the country's small but still available indigenous resources, however, stipulate a 60/40 ratio of division (after costs) in the government's favour.[11] That is how the Philippine government still has a certain control over the country's crude oil supply.[12]

China and Indonesia are also relatively easy cases. In China, the state still controlled almost 100% of the country's crude oil supply in 2013. NOCs were almost the only companies granted import licenses to import crude oil to the country.[13] Indigenous oil E&P was overwhelmingly dominated by 100% state-owned NOCs and their subsidiaries.[14] Although three such subsidiaries have been publicly traded since the turn of this century, the parent NOCs still held between 65 to 86% of these companies' shares and had a tight grip on their management.[15] In addition, all five companies that held licenses to import crude oil into China were 100% state-owned and the situation only began to change in 2014.[16]

In Indonesia, the state can be said to control 100% of the crude supply to the economy. Although the 100% state-owned NOC Pertamina only produced about 17% of the

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http://www.temasek.com.sg/abouttemasek/corporategovernance.

[10] The exploration entity of the company only conducted seismic data acquisition and other studies "in preparation for well drilling activities." *Philippine National Oil Company 2013 Annual Report*, 4.

[11] Teodoro M. Santos, "Philippine Energy Policy and Problems in a Changing World," in *Energy Market and Policies in ASEAN*, ed. Shankar Sharma and Fereidun Fesharaki (Singapore: Institute of Southeast Asian Studies, 1991), 142.

[12] The default option is for the government to take the oil developed in proceeds from the 60% of oil developed and marketed by the oil firm, but it can also elect to receive its share in kind, too. It is through this way that the Philippine government can control the supply of the crude oil in the country. See a model oil service contract on the Philippine Department of Energy website, accessed 30 March 2016, http://www.doe.gov.ph/pecr5/index.php/petroleum/petroleum-model-contracts.

[13] The first private energy firm that applied for and obtained a relatively small crude oil importing license in China was Guanghui Energy in 2012. See Tim Daiss, "China State-Owned Oil Monopoly System to Slowly Change," *The Energy Tribune* website, 4 July2013, accessed 12 August 2015, http://www.energytribune.com/77959/china-state-owned-oil-monopoly-system-to-slowly-change#sthash.o2zlnfLm.dpbs. Also see "China Opens up crude oil import to private refineries," Xinhua News Agency website, 24 July 2015, accessed 11 August 2015, http://www.chinadaily.com.cn/business/2015-07/24/content_21393937.htm.

[14] CNPC, the biggest 100% state-owned NOC, and its 86% owned subsidiary PetroChina together account for about 54% of China's crude oil output and IOCs are only taken on as minority partners in offshore oil and gas E&P projects. See U.S. Energy Information Administration report on China, last updated 14 May 2015, 5.

[15] According to the 2013 annual reports of these three subsidiaries, the shareholdings of these companies by their 100% state-owned parents were (listed in descending order of the companies' crude production): PetroChina - 86.51% (page 15), Sinopec Corp. – 73.96% (page 6), and CNOOC Ltd. – 64.66% (page 57).

[16] "China Approves Crude Import Licenses for Two Independent Refineries," Platts 25 August 2015, http://www.platts.com/latest-news/oil/singapore/china-approves-crude-import-licenses-for-two-27740362.

indigenous crude through 2012,[17] Pertamina "owns and operates eight of the country's nine oil refineries (the ninth is owned by the Research and Development Agency of the Agency of Department of Energy and Mineral Resources)."[18] This refining capacity only covers about 64% of the country's consumption needs and so the shortfall is covered by imported oil products.[19] Therefore, all the crude oil supply to feed the refineries in Indonesia (from either domestic or overseas sources) was acquired by state-controlled or funded entities.

The calculation of the first component of the strategic oil supply indicator for five of the remaining six case study economies conforms to a two-step process. These five economies are India, South Korea, Taiwan, and Thailand. Japan is the other remaining case study and will be addressed below. First, the percentage(s) of shares the state owns in NOC(s) is obtained (a). Then the crude oil produced and imported by these compan(ies) in 2013 as a percentage of total oil consumption of the economy in the same year is calculated (b).[20] The final figure of the percentage of state control of the economy's crude oil supply is obtained by multiplying (a) with (b). The Philippines' NOC did not produce or procure any crude oil in 2013, but the government's share of oil developed by private firms in the country is used to do the computation instead.[21] Details of calculation are listed in Table 3.1 below:

India	**% of Government Share of NOCs** [22]	**Oil Consumed**	**Oil Produced or Procured (million tonnes)**	**% of control of oil consumed**	**% of state control**

[17] For the shareholding percentage of the state, see *Pertamina EP Integrated Annual Report 2013*, 14. For the company's domestic crude production share, see "Indonesia Country Report," U.S. Energy Information Administration (EIA) website, last updated March 5, 2014.

[18] "Oil and Gas in Indonesia – Investment and Taxation Guide May 2014 – 6th edition" Pricewaterhouse Cooper Indonesia (page 13), assessed 10 August 2015, http://www.pwc.com/id/en/publications/assets/oil_and_gas_guide_2014.pdf

[19] "Indonesia," U.S. EIA website, last updated March 5, 2014.

[20] The oil and consumption and production figures of all case-study economies in this study come from *BP Statistical Review of World Energy* of various years of except otherwise noted. These figures may have slight discrepancies from national figures, but having the consistency of all data available in the same units of measurement is a major benefit that greatly facilitates comparisons across nine economies.

[21] PNOC's 2013 annual report does not mention any actual oil produced or procured by itself or its upstream subsidiary, PNOC EC. It only mentions the production of natural gas. See page 6 of the report.

[22] The five companies included in this study are the biggest NOCs and their subsidiaries or affiliates that produce or procure crude oil in India. The Gas Authority of India Limited, which only engaged in the production and distribution of gas, is not included. All five are central-level public sector enterprises (CPSEs). For a list of such CPSEs as of 2014, see "List of Maharatna, Navratna and Miniratna CPSEs," Department of Public Enterprises of India, accessed 20 April 2016, http://dpe.nic.in/publications/list_of_maharatna_navratna-and_miniratna. The first three listed are mostly oil marketing companies (OMCs), meaning mid- to downstream oil firms, but control crude oil supply in India by procuring it from various sources to feed their refineries. For these companies, only the crude they import is counted in this study to avoid double counting, unless evidence clearly shows otherwise. This is because their domestic crudes are likely supplied by Oil India or ONGC since these two integrated firms do not have much refinery capacity of their own. Oil India only holds 26% equity in Numaligarh Refinery Limited. See "Profile," Oil India Limited website, accessed 20 April 2016, http://www.oil-india.com/Profile.aspx.

		(million tonnes)[23]			**of oil supply**
Bharat Petroleum	55.79[24]		22.79[25]	9.70	7.26
Hindustan Petroleum	51.11[26]		15.41[27]	8.79	4.49
Indian Oil Corporation Ltd. (IOCL)	78.92[28]		42.53[29]	24.27	19.15
Oil India	68.43[30]		3.66[31]	2.09	1.43
ONGC & ONGC Videsh	68.94[32]	175.25	31.49[33]	17.97	12.39
				Total:	**44.72**

Philippines	**% of Government Share of Oil Developed[34]**	**Oil Consumption in 2013 (thousand barrels daily)[35]**	**Oil Produced in 2013 (thousand barrels daily)[36]**	**% of state control of oil supply**
	60	298	26	**5.23**
South Korea	**% of Government Share of**	**Oil Consumption in 2013**	**Oil Produced by KNOC in**	**% of state control of oil supply**

[23] *BP Statistical Review of World Energy June 2014*.
[24] *Bharat Petroleum Annual Report 2013-14*, 77. Only the shares held by the Government or President of India and the State Government (in this case the Government of Kerala) are counted, not other CPSEs. Many CPSEs are not 100% government-owned. More importantly, if they are not related to the oil sector, they are just passive investors, unlikely to interfere with the management decisions. If they are oil sector CPSEs, such as the Indian Oil Corporation in the case of ONGC, counting them would be tantamount to double counting. The same rule will be applied to all the companies listed here.
[25] Ibid., 52. This includes both its domestic production from Mumbi High and its crude import in year 2012-13.
[26] *Hindustan Petroleum Corporation Annual Report 2012-13*, 73.
[27] Ibid., 36. This includes both imported crude and domestic crude Hindustan Petroleum "uplifted" in three specific fields.
[28] *Indian Oil 2013-14 Annual Report*, 87. According to the note on this page, up to 13 March 2014, the President of India was holding 78.92% of the company's shares. Then on 14 March 2014 he divested 10% of the shares in favour of ONGC and 5% to Oil India Ltd. The 78.92% figure for year 2013 is used in this study.
[29] This is the amount of crude imported by the company in 2012-13, which is not from domestically produced oil and most likely not bought from ONGC. The company's crude throughput for its refineries during the same period is 54.65 million tons. The difference of these two figures is likely from domestic production or bought from ONGC. In using the smaller of the two amounts, there is not any double counting. The sources of the two figures are from page 38 and 44 respectively of the *India Oil 2013-14 Annual Report*.
[30] *Oil India Limited 2013-14 Annual Report*, 70.
[31] *Oil India Limited 2013-14 Annual Report*, 11.
[32] *Oil and Natural Gas Corporation Limited Annual Report 2013*, 136.
[33] Ibid., 53.
[34] Teodoro M. Santos, "Philippine Energy Policy and Problems in a Changing World," in *Energy Market and Policies in ASEAN*, ed. Shankar Sharma and Fereidun Fesharaki (Singapore: Institute of Southeast Asian Studies, 1991), 142. Also see a model oil service contract on the Philippine Department of Energy website, accessed 30 March 2016, https://www.doe.gov.ph/model-petroleum-service-contract-0.
[35] *BP Statistical Review of World Energy June 2014*.
[36] U.S. E.I.A. website, accessed 10 April 2016, http://www.eia.gov/beta/international/.

	KNOC – the only NOC of the country[37]	**(thousand barrels daily)[38]**	**2013 (thousand barrels daily)[39]**	
	100	2,460	220	**8.94**
Taiwan	**% of Government Share of CPC Corp. – the only NOC of the country[40]**	**Oil Consumption in 2013 (million tonnes)[41]**	**Oil Imported by CPC Corps in 2013 (million tonnes)[42]**	**% of state control of oil supply**
	100	43.4	19.08	**43.97**
Thailand	**% of Government Share of PTT – the only NOC of the country[43]**	**Oil Consumption in 2013 (thousand barrels daily)[44]**	**Oil Produced and Procured by PTT in 2013 (thousand barrels daily)[45]**	**% of state control of oil supply**
	51.11	1,211[46]	1,004	**42.37**

Table 3.1 State Control of Crude Supply in India, Philippines, South Korea, Taiwan and Thailand in 2013

The case of Japan is somewhat different and therefore, the method of ascertaining the state control of the country's crude oil supply is also different. In 2013, Japan did not have a "traditional" NOC comparable to those of its Asian peers. Japan Oil, Gas and Metals National Corporation (JOGMEC), a public entity tasked to "ensure a stable, inexpensive supply of oil"[47] does not engage in oil E&P or procurement directly. Instead, it provides financial assistance to oil E&P projects of Japanese oil firms in the form of equity capital and liability guarantees.[48] Therefore, literature on Japanese oil security normally uses the term "self-developed oil" or "equity oil" to describe oil produced as a result of such financial assistance. The amount of this self-developed oil "has hovered between 10 and 15 per cent

[37] "Moody's assigns A1 to Korea National Oil Corp's MTN drawdown," 15 Jan 2014, Moody's Investor Service website, accessed 30 August 2015, https://www.moodys.com/research/Moodys-assigns-A1-to-Korea-National-Oil-Corps-MTN-drawdown--PR_290612.
[38] *BP Statistical Review of World Energy June 2014*.
[39] KNOC Annual Report 2013, 18.
[40] "Fitch affirms CPC Corporation, Taiwan at 'A+'; outlook stable," 22 May 2012, Reuter's website, accessed 30 August 2015, http://www.reuters.com/article/idUSWLB014020120522.
[41] *BP Statistical Review of World Energy June 2014*.
[42] The CPC Corporation imported 139.9 million barrels of crude oil into Taiwan for refining in 2013. See *CPC 2014* [Annual Report], 12. This number is converted into tons by using the BP conversion formula of one barrel equals 0.1364 ton. See *BP Statistical Review of World Energy June 2014*, 44.
[43] *PTT Annual Report 2013*, 130.
[44] *BP Statistical Review of World Energy June 2014*.
[45] *PTT Annual Report 2013*, 37.
[46] *BP Statistical Review of World Energy June 2014*.
[47] "History of JOGMEC," JOGMEC website, accessed 20 September 2015, http://www.jogmec.go.jp/english/about/about003.html.
[48] The other three main roles of JOGMEC listed on its website are: Technology Development, Gathering/Providing Information, and Geological Surveys. Accessed 20 September 2015, http://www.jogmec.go.jp/english/oil/index.html.

[of Japan's total import] over the past decade."[49]As Japan practically imports all of its crude oil, this also equals the percentage of its consumption. Using the historical figure for the last decade as a guide, this project will adopt 11% as the amount of crude oil supply "controlled" by the state.

Table 3.2 below recaps the results of the first component of the strategic oil supply indicator of all nine case study economies:

Economy	**% of government control of crude oil supply in 2013**
China	99
India	45
Indonesia	100
Japan	11
Philippines	5
Singapore	0
South Korea	9
Taiwan	44
Thailand	42

Table 3.2 State Control of Crude Oil Supply in Case-Study Economies in 2013

2.1.3 Component 2: Size of Strategic Petroleum Reserves

The second component of the strategic oil supply indicator is the size of countries' SPR. As mentioned earlier, generally maintaining an SPR is more market-conforming than the first component. Even the major oil consuming organization of the more liberal OECD economies, the International Energy Agency (IEA), approves of this measure as a way to achieve oil supply security.[50] Using this strategic supply oil to compile the indicator, therefore, provides a more nuanced understanding of the overall level of strategic oil supply measures adopted by economies at different stages of development.

Unlike the method used by the IEA, this indicator only counts the days of net oil import equivalent of SPR held by the state through a public entity or oil stocks held by NOC(s). The minimum stocks private oil firms in the country are mandated to hold, and commercial stocks voluntarily maintained by private firms are excluded.[51] Establishing and

[49] Vlado Vivoda, *Energy Security in Japan: Challenges After Fukushima* (Farnham, Surrey, GBR: Ashgate Publishing Ltd, 2014), 59. The 11% used in this study is also based on the 10.5% of such "self-developed oil" by Japanese oil firms in 2005. See Masanari Koike, Gento Mogi, Waleed H. Albedaiwi, "Overseas oil-development policy of resource-poor countries: A case study from Japan," *Energy Policy* 36 (2008), 1765.

[50] It does not mean that, however, there is a consensus among economists of its effectiveness or necessity. For example, Giacomo Luciani argues for their ineffectiveness in "Geopolitical Threats to Oil and the Functioning of the International Oil Market," *Centre for European Policy Studies Policy Brief No. 221/November 2010*.

[51] The IEA requirement is as follows: "This commitment can be met through stocks held exclusively for emergency purposes and stocks held for commercial or operational use, including stocks held at refineries, port facilities and in tankers in ports." *Energy Supply Security 2014* (Paris: IEA, 2014), 30. For a discussion distinguishing between the two and related issues, see Giacomo Luciani and

maintaining an SPR as strategic insurance calls for considerable material capability and commitment from the state involved. Therefore, using this criterion is more parsimonious as well as more in line with the puzzle underlying this study – what compelled states to intervene directly in the economy's oil supply at all? Of course, as detailed in Table 3.3 below, some countries have both an SPR and mandatory requirements for oil firms; some only the latter, and some neither. This gradation appears to imperfectly fit the assumption of the correlation between the type of oil stockpiling measure adopted and the state's material capability.

Economy	**Number of oil import equivalent of days of SPR & NOC stock in 2013**
China	17[52]
India	1[53]
Indonesia	47[54]
Japan	84[55]
Philippines	0[56]
Singapore	0[57]

François-Loïc Henry, *Strategic Oil Stocks and Security of Supply*, CEPS Working Document, No. 353, June 2011.

[52] According to a report in the *South China Morning Post*, around 2013 and 2014, China's SPR totalled 12.43 metric tons. Using the *BP Statistical Review of World Energy 2014 Workbook*'s 2013 import figure to make the calculation, this is the equivalent of about 16 days of oil imported. One day is needed to this figure as the amount of stocks held by NOCs is unclear. See Angela Meng, "China reveals size of strategic oil reserve for first time," the *South China Morning Post*, 21 November 2014, accessed 28 July 2015, http://www.scmp.com/news/china/article/1644890/china-reveals-size-strategic-oil-reserve-first-time.

[53] Various media reports point out that India only made the first crude purchase for its SPR in 2015 and so it did not have one in 2013. One day is put in here, as in the case of China, to represent the stock Indian NOCs might be holding. See "Exclusive: India makes first crude oil purchase for strategic reserve," *Reuters*, March 30, 2015, accessed 3 August 2015, http://in.reuters.com/article/2015/03/30/india-energy-spr-idINKBN0MQ1N220150330.

[54] Indonesia did not have a SPR as of 2013. See Montty Girianna, "The need for a national strategic petroleum reserve," The Jakarta Post, February 13, 2013, accessed 23 August, 2015, http://www.thejakartapost.com/news/2013/02/13/the-need-a-national-strategic-petroleum-reserve.html. However, the 100% state-owned Pertamina is expected to hold between 18 to 22 days of demand. The mean of this range, 20 days of demand, equals to about 47 days of import with Indonesia's oil self-sufficiency rate of about 58% in 2013, calculated with the *BP Workbook 2014* figures. See "Indonesia seeks to mandate oil stocks amid rising demand," Platts website, 18 Jun 2015, accessed 5 August 2015, http://www.platts.com/latest-news/oil/jakarta/indonesia-seeks-to-mandate-oil-stocks-amid-rising-27522846.

[55] *Energy Supply Security – Emergency Response of IEA Countries 2014* (Paris: IEA, 2014), 281.

[56] According to the IEA, since 2002, the Philippine "government requires oil refiners to maintain a minimum inventory level of 15 days, while oil importers are obliged to hold 7 days of domestic supply." See *Energy Supply Security – Emergency Response of IEA Countries 2014*, 510. PNOC, the Philippines' NOC, did not engage in either oil refining or importing any more in 2013. See *Philippine National Oil Company 2013 Annual Report*. Therefore, the Philippines did not maintain any SPR according to the definition of this study.

[57] "…there is no mandatory stockholding requirement for refineries or private oil companies operating in Singapore and obligatory crude oil stockpiling was abolished in 1983. Operational stocks in refineries are estimated at around 50 days." *Energy Supply Security – Emergency Response of IEA Countries 2014*, 510. However, since there is no NOC in Singapore in 2013, the refinery stock requirement is not counted as a strategic oil supply measure according to the definition of this study.

South Korea	122[58]
Taiwan	90[59]
Thailand	23[60]

Table 3.3 Number of oil import equivalent of days of SPR & NOC stock in 2013

The numbers of days of SPR above are converted to percentages by using the IEA 90-day figure as 100%. Economies that have more than 90 days of SPR score over 100% as the two components of the indicator are compensatory to each other. These percentages are aggregated with the first component of the indicator with a 50% weighting to reflect its higher degree of market-conformity.[61] Table 3.4 below summarises the scores of the strategic oil supply indicator of all nine case-study economies in 2013, 100 being the highest level of strategic oil supply measures adopted and 0 the lowest. They are used to calculate the corresponding trichotomous levels of strategic oil supply measures adopted by these economies, that is, their DV levels, in 2013:[62]

Economy	**Strategic Oil Supply Indicator Scores, SPR 50% weight**	**Trichotomous Strategic Oil Supply Measure (DV) Level**
China	54.22	High
India	22.64	Medium
Indonesia	63.06	High
Japan	28.83	Medium
Philippines	2.50	Low
Singapore	0.00	Low
S. Korea	38.39	Medium
Taiwan	47.00	High
Thailand	27.39	Medium

[58] *Energy Supply Security – Emergency Response of IEA Countries 2014*, 296.

[59] Although there have been disputes the actual amount of SPR maintained by the Taiwanese government over the years, the 90 days of supply (basically the same as import) figure (comprising of 30 days of SPR and 60 days of NOC emergency stockpile) for 2013 is adopted in this study according to the following two sources. Rosemary A. Kelanic, "Oil Security and Conventional War – Lessons From a China-Taiwan Air Scenario," Council on Foreign Relations Energy Report, October 2013, 7; and Huei-Chu Liao and Sih Ting Jhou, "Taiwan's Severe Energy Security Challenges," Brookings Institute website, September 2013, accessed February 27, 2016, http://www.brookings.edu/research/opinions/2013/09/12-taiwan-energy-security-liao.

[60] In 2013, the Thai Ministry of Energy stipulated oil companies to hold 36 days of reserves. The NOC PTT controlled about 42% of the country's crude supply (see Table A1), and Thailand's oil self-sufficiency rate that year was about 33% (calculated with the *BP Statistical Review of World Energy 2014 Workbook* figures). Therefore, the number of days of government controlled days of imported oil equivalent figure is (36 x 0.42) /0.67 = about 23.

[61] See Table A1 in Appendix B for the results of aggregation with different weightings and with and without capping this component at 100% (meaning conceptualised as non-compensatory to the first component).

[62] See Table A2, Appendix B for the DV levels generated with the results of different weightings and with and without capping of SPR at 100% in Appendix B. As a rule, for all weighting methods, DV scores within one standard deviation of the average (falling within 0.5 above and 0.5 below the mean DV score of the nine in the weighting method in question) are considered having a medium level. DV Scores more than 0.5 standard deviation above the average are considered having a high level and 0.5 or more below are considered having a low level.

Table 3.4 Nine-Economy Strategic Oil Supply Indicator Scores and DV Levels in 2013

2.2 Independent Variable: Oil Vulnerability Indicator

The OV indicator is made up of market and supply risks.[63] Market risks relate to the effect of fluctuations of oil prices on national economies, such as inflation. In this project, they are measured by: (1) per capita cost of imported oil as a percentage of the economy's per capita GDP (all in US$); and (2) oil consumption as a percentage of the total primary energy consumption. Supply risks relate to an economy's vulnerability to oil supply disruptions. The supply-risk measures chosen are: (1) oil self-sufficiency rate; and (2) the amount of crude an economy imported as a percentage of the global crude imported of the same period. The logic for this second measure is that the higher this percentage is, the more difficult it would be to acquire the amount needed due to market liquidity issue during supply disruption situations. Equal weights are given to all four measures, which are normalised so that a higher overall score means a higher OV.[64] Table 3.5 below summarises the 2013 OV of all nine case-study economies, 100 being the highest and 0 being the lowest. The right hand column shows their corresponding trichotomous OV, that is the IV levels in this study:[65]

Country	Oil Vulnerability	Trichotomous OV (IV) Level
China	23.18	Low
India	28.15	Low
Indonesia	21.90	Low
Japan	38.80	High
Philippines	33.91	Medium
Singapore	47.66	High
South Korea	36.44	Medium
Taiwan	35.36	Medium
Thailand	28.11	Low

Table 3.5 Oil Vulnerability of Nine Asian Net Importing Economies in 2013

2.3 Intervening Variable 1: Strength of Private Capital

In this section, I examine the strength of private capital by investigating the overall economic freedom in the nine case studies in 2013. The results of two "off-the-shelf" indicators are averaged to obtain the readings used in this study. The proposed model

[63] The OV index developed by Eshita Gupta, which the OV indicator in this project is simplified and adapted from, has four different measures or each of the two types of risks. See "Oil Vulnerability Index of Oil-Importing Countries," *Energy Policy* 36 ((2008); 1198-1200.

[64] In a natural setting, the higher the value of the first supply risk measure (oil self-sufficiency rate), the lower the OV. So this indicator will be normalised to reflect the same direction as the other three indicators: Higher values indicate higher OV.

[65] For details of the calculation of countries' OV in 2013, see Table A3, Appendix B. The same principle of how the trichotomous levels are devised described in footnote 62 also applies here and in the rest of this chapter except noted otherwise.

expects that the freer and more open an economy is at any given time, the stronger private capital in it would be versus the state.

I use the Index of Economic Freedom (IEF) put out by the Heritage Foundation and the *Wall Street Journal* and the Economic Freedom of the World (EFW) Annual Reports released by the Fraser Institute. Both assign an annual overall score of economic freedom to each economy surveyed. For the IEF, 10 components in the four major categories of rule of law, limited government, regulatory efficiency, and open markets;[66] the five components of the EFW are size of government, legal system and property rights, sound money, freedom to trade internationally, and regulation.[67] Both of these indexes take into consideration a wide range of economic and legal/regulatory status quo that reflect the power equilibria of major stakeholders in an economy. They are, therefore, fair representations of the spirit of the reasoning of the proposed model.

The IEF scores range from 0 to 100, 100 being "the freest" while the EFW spans from 0 to 10. Since the scores of the other two indicators in this project range from 0 to 100 (and to facilitate comparison), the EFW scores are adjusted to the same scale. The two scores of each economy are then averaged to gauge the overall economic freedom of the nine case studies in this project.[68] Table 3.6 below presents these scores and the trichotomous levels of economic freedom, which are also the historical-institutional strength of private capital of the case-study economies in 2013:

Economy	IEF with 2013 Data	EFW with 2013 Data (adjusted)	Combined Average Economic Freedom Scores	Economic Freedom (Private Capital Strength) Level
China	52.5	64.4	58.45	Low
India	55.7	66.1	60.90	Low
Indonesia	58.5	71.7	65.10	Medium
Japan	72.4	75.0	73.70	High
Philippines	60.1	70.7	65.40	Medium
Singapore	89.4	83.9	86.65	High
S. Korea	71.2	71.9	71.55	Medium

[66] "About the Index," accessed 14 May 2014, http://www.heritage.org/index/about. On the website, it says 12 factors are taken into consideration, but for 2013 data, only 10 are used for calculation on the spreadsheet for downloading on its site, which is the source for the analysis in this study: (http://www.heritage.org/index/download).

[67] James Gwartney, Robert Lawson, and Joshua Hall, *Economic Freedom of the World 2014 Report* (Fraser Institute, 2014), 231-243.

[68] This means I simply multiply the original EFW scores by 10. The IEF scores are from the 2014 index, which covers data from the second half of 2012 and the first half of 2013. See "About Index" and "Explore the Data" pages, accessed 10 November 2014, http://www.heritage.org/index/about. For the actual IEF scores, see Terry Miller, Anthony B. Kim, and Kim R. Holmes, "Highlights of the 2014 Index of Economic Freedom," accessed 1 December 2015, http://thf_media.s3.amazonaws.com/2014/pdf/Index2014_Highlights.pdf. The EFW scores are drawn from the 2015 report which covers 2013 data. See James Gwartney, Robert Lawson, and Joshua Hall *Economic Freedom of the World 2015 Report* (Fraser Institute, 2015), 17-20.

Taiwan	73.9	78.4	76.15	High
Thailand	63.3	65.9	64.60	Low

Table 3.6 Economic Freedom Scores and Private Capital Strength Levels of Nine Case-Study Economies in 2013

The results show that in 2013 China, India, and Thailand had a low trichotomous level of overall economic freedom among the cohort of nine Asian-Pacific economies examined in this plausibility probe. China scored the lowest in both indicators overall, but it actually only scored the lowest in three of the 10 components that make up the IFE indicator for that year. These three components are "property rights," "investment freedom," and "financial freedom." India scored the second lowest on the IFE index and also ranked the bottom in three components: "business freedom," "monetary freedom," and "trade freedom." Thailand did not rank the lowest in any of the IFE index components, but ranked lower than both China and India in one of the five categories investigated by the EFW indicator: "Legal System and Property Rights."

Indonesia, the Philippines, and South Korea had a medium trichotomous level of overall economic freedom. The scores of Indonesia and South Korea were very similar, but South Korea's was noticeably higher, meaning it enjoyed a freer economy and private capital there was stronger than in the other two medium-level countries in 2013.

Japan, Singapore, and Taiwan had a high level of overall economic freedom, with Singapore scored much higher than the other two in both indicators. In fact, Singapore received the highest scores in nine out of the 10 components of the IEF indicator. It only scored lower than Japan for "Monetary Freedom." Japan, however, scored the lowest among all nine case studies in 2013 for "Fiscal Freedom" in the IEF indicator. This component compares individual income and corporate tax rates among economies to judge the "freedom" the public had in spending their income or revenues after fulfilling their tax obligations. Taiwan ranked the second highest in both indicators and received higher scores in four of IEF's 10 components than Japan: "Investment Freedom," "Trade Freedom," "Business Freedom," and "Fiscal Freedom." Singapore received the highest scores in four of the five categories investigated by the EFW indicator, but scored lower than Japan, South Korea, and Taiwan in "Sound Money," which measures "money growth," inflation, and freedom to own foreign currency bank accounts.

2.4 Intervening Variable 2: Trust in Oil Markets

This section examines decision-makers' overall trust that oil markets can adequately provide oil security to the economy. The three major components making up the trust variable are investigated separately. They are (1) the presence/absence of NOCs and their coherence as securitising/lobbying agents, (2) the domestic context; and (3) the

external context that can be used by NOCs for securitization or lobbying. Each of these contexts impacts on decision-makers' risk preferences and belief formation related to the trust in the domestic and the international oil markets respectively. At the end, results of trust levels generated by these three components are combined to measure the case studies' overall trust levels in the oil markets. Figure 3.1 below summarises how these three components contribute to the overall trust level of an economy in oil markets as detailed in the next four sub-sections:

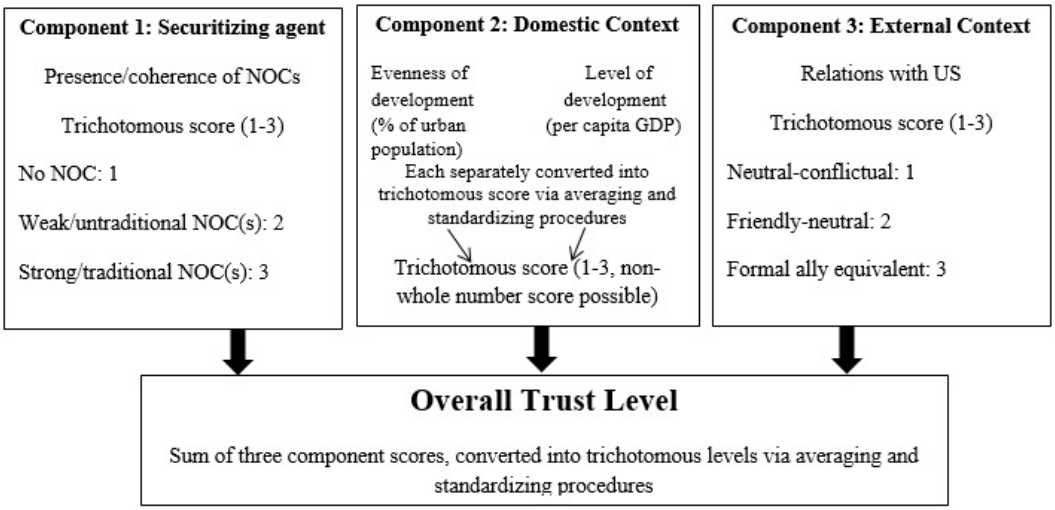

Figure 3.1 Construction of overall trust level in oil markets

2.4.1 Component 1: Securitising Agents

NOCs are hypothesised to securitise oil supply issues to justify their existence and expand their operations. The more "present" and coherent they are, therefore, the stronger their securitising strength is supposed to be. This is hypothesised to lead to a lower the level of trust if the contexts of securitising remain constant. According to this reasoning, economies with at least one "traditional" NOC are more prone to securitization and are generally assigned the lowest score for this component of trust in the market. A traditional NOC is defined as one that has been functioning reasonably well in at least one of the major sectors of the oil supply chain in that economy in the decade being studied. Economies with an untraditional "NOC" or NOCs that were incoherent or inept in securitising receive a middling score. Economies without any form of NOCs receive the highest trust score. Table 3.7 below summarises the securitising agent scores of the nine case-study economies in 2013:

Political Entity	Presence of Coherent Securitising Agent	NOC Securitising Strength/Trust Score
China	Multiple powerful traditional NOCs	Low/1
India	Multiple powerful traditional NOCs	Low/1
Indonesia	Single powerful traditional NOC	Low/1
Japan	Non-traditional NOC	Medium/2

Philippines	Single Weak traditional NOC	Medium/2
Singapore	No NOC	High/3
South Korea	Single powerful NOC	Low/1
Taiwan	Single powerful NOC	Low/1
Thailand	Single powerful NOC	Low/1

Table 3.7 NOC Securitising Coherence-Strength and corresponding Trust Core of Nine Case-Study Economies in 2013

Most of the contents of the above table should be self-explanatory with the discussions detailing these economies' NOCs or lack thereof in Section 2.1.1 above. Japan is assigned the middling score because it had not had a traditional NOC since 2004.[69] While the Philippines had a traditional NOC PNOC in 2013, it did not produce or procure any crude oil.[70]

Two thirds or six of the nine case studies received the low trust score for this component because they had at least one powerful NOC as of 2013. Japan and the Philippines received the middle score because of the reason explained in the last paragraph. Singapore was the only one that received a high trust score because it no longer had an NOC in the years leading to 2013.

2.4.2 Component 2: Domestic Securitising Context

In this section, I measure the evenness and level of economic development of the case studies. This is justified because these two aspects together form a major context NOCs could use to securitise or lobby their importance in the domestic oil market. Without using the terminology, NOCs could co-opt the economic concept of merit goods. According to this concept, government provision of these goods, such as primary education, generates positive externalities to the whole society.[71] The more unequal and poorly developed an economy, the more persuasive this argument would be. This is because positive externalities are much needed when the basic oil supply needs of a large segment of the population might not be adequately served by private oil firms due to lack of profitability. NOCs could easily seize the salience of the context to perpetuate their existence. NOC securitisation would be especially plausible in societies more used to state intervention in other aspects of public lives and more open to non-neoliberalist economic measures.

The percentage of the polity's urban population is used as a proxy for the geographical evenness of development. A larger urban population usually indicates a more even economic development across the country. While there are urban slums with great poverty, the concentration of people itself would facilitate ready markets for private firms. This means that it would be easier for the masses to access the oil they need without

[69] See footnotes 47 and 48.
[70] See footnote 21.
[71] See footnote 8 and 9 for references of the concept of merit goods.

government intervention. Per capita gross domestic products (GDP) are measured to gauge the level of economic development. The scores polities receive for these two aspects are averaged to generate an overall domestic context trust score.

The vulnerability-interaction model predicts that an objective domestic environment of relatively even and high level of economic development would make NOCs' attempts to trump up their importance in ensuring supply oil to the poor and/or rural population more difficult. This would in turn generate a higher trust level in the functioning of a free domestic oil market and a correspondingly high trust score. Conversely, polities with a large rural population and/or a low GDP receive a low trust score due to the relevance for NOC securitising. Table 3.8 below summarises the domestic securitising conditions and resulting trust scores of the nine case studies in 2013. A higher overall domestic context trust score denotes a higher level of trust in the functioning of a free domestic oil market.

Polity	**Percentage of Urban Population 2013**[72]	**Level of Urbanization/ resulting trust score**[73]	**Per Capita GDP (PPP) 2013 in US$**[74]	**Level of Economic Development/ resulting trust score**	**Overall Domestic Context Trust Score**
China	53	Medium/2	12,211	Low/1	1.5
India	32	Low/1	5,268	Low/1	1.0
Indonesia	52	Low/1	10,011	Low/1	1.0
Japan	92	High/3	36,618	Medium/2	2.5
Philippines	45	Low/1	6,588	Low/1	1.0
Singapore	100	High/3	80,780	High/3	3.0
South Korea	82	High/3	32,664	Medium/2	2.5
Taiwan	70	Medium/2	43,600	High/3	2.5
Thailand	48	Low/1	15,437	Low/1	1.0

Table 3.8 Urban Population Percentage, Per Capita GDP, and corresponding trust scores of Nine Case-Study Economies in 2013

The results show that India, Indonesia, the Philippines, and Thailand had the most salient overall domestic context for NOCs to securitise their role in their respective domestic

[72] The data source, except that of Taiwan, is from the World Bank website, accessed 11 November 2015, http://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS. The data for Taiwan is the latest I can find (year 2010). See *Social Indicators 2012* (Taipei, Taiwan: The Chinese Statistical Association, 2013), 280.

[73] The levels of urbanization, economic development, and overall domestic context trust level are compiled by using the same method of averaging and standardising the results of all case study countries as specified in footnote 62 above. The same is true in all comparative levels thereafter unless noted otherwise.

[74] The data source, except that of Taiwan, is from the World Bank website, accessed 10 October 2016, http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?order=wbapi_data_value_2012+wbapi_data_value+wbapi_data_value-last&sort=desc. The data source for Taiwan is from "The World Factbook," CIA website (estimated 2014 figure),accessed 8 October, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html.

oil markets. These four economies, therefore, received the lowest overall domestic context trust score. China was a little more urbanised and received a slightly higher overall domestic context trust score than those four. Japan, South Korea, and Taiwan all received the same overall domestic score of 2.5 out of the highest possible of 3, signifying they reached a rather high level and even economic development. Singapore had the highest domestic context trust score because its economic development was at such a high level that securitising about the untrustworthiness of the domestic oil markets would be difficult.

2.4.3 Component 3: External Securitising Context

This sub-section assesses the overall relations between the case-study polities and the United States in 2013. The vulnerability-interaction model hypothesises that these relations form the major external context that NOCs and other interested parties could use to securitise to lower decision-makers' trust in solely relying on the international markets to fuel their respective economies. The United States has been a hegemonic power and dominant player in most international institutions for about 70 years. The most important international oil exchanges (markets) and oil price reporting agencies, which have been an integral part of the functioning of the current oil-pricing regime, are American firms.[75] In addition, it is still the only country that has overwhelming naval power to impede the physical flow of maritime oil supply to the Asia Pacific.[76] If these facts are securitised to be

[75] Two of the three major international oil exchanges are U.S. companies. They are the New York Mercantile Exchange (NYMEX), owned by the Chicago Mercantile Exchange Group and the Intercontinental Exchange (ICE), listed on the New York Stock Exchange and headquartered in Atlanta, Georgia. See Alex Longley, "In Battle of World's Biggest Oil Exchanges, One Gets Turbo Charge From Export," Bloomberg website, 7 November 2016. Accessed 27 December 2016, https://www.bloomberg.com/news/articles/2016-11-08/in-battle-of-oil-exchanges-nymex-gets-turbo-charge-from-exports.
The Dubai Mercantile Exchange (DME), where Oman crude oil futures contract, a major benchmark for crude oil price in Asia, is owned and operated by Dubai and Oman companies. The DME, however, has a "strategic partnership" with the CME to extend its clearing services. This likely provides further "proof" of the great reach of American power and doubts of these exchanges' fairness to U.S. adversaries. See "CME Group Strategic Partnership with Dubai Mercantile Exchange," DME website, accessed 27 December 2016, http://www.cmegroup.com/international/partnership-resources/dme-resources.html.
Of the two most important oil reporting agencies, one is U.S. (Platts) and the other is a U.K.-based company (Argus Media). For more about the roles played by these agencies and issued associated with them in international oil transactions, see "Oil Price Reporting Agencies – Report by IEA, IEF, OPEC and IOSCO to G20 Finance Ministers, October 2011." Website of The International Organization of Securities Commissions (IOSCO). Accessed 10 October 2016, https://www.iosco.org/library/pubdocs/pdf/IOSCOPD364.pdf.

[76] Hughes and Long, "Is There an Oil Weapon?" 173 – 180. China's naval capability has improved dramatically since the 1990s and is described as being able to "conduct high intensity operations" in its immediate periphery and "carry out low intensity operations around the world" as of 2013. China may possess the naval power to effectively counter any interdiction of maritime oil shipment to China in the future, but such capability has not been realised yet. See Craig Murray, Andrew Berglund, and Kimberly Hsu, "China's Naval Modernization and Implications for the United States," U.S.-China Economic and Security Review Commission Staff Research Backgrounder August 26, 2013. Accessed 20 February 2017,

viewed through a zero-sum aggressive economic nationalist lens, they would impact on decision-makers' risk preferences and belief formation on the trustworthiness of the international oil markets. This would be especially pertinent for those with negative relations with the United States.

The case-study polity's relations with the United States are categorised in three descending levels of "closeness" as: formal or de facto allies, friendly-neutral, and neutral-conflictual in this study. The "closer" or better the relationship was, the higher the trust in the international oil markets.

China is coded the third category. There has been cooperation between China and the United States in such policy areas as reduction in carbon emission and diplomatic pressure on the North Korean regime on anti-nuclear proliferation in the last two decades. The repeated incidents of military tension between China and the United States or its allies during the same period, however, were much more prominent.[77] Furthermore, the prospect of resolving a number of contentious issues appears dimmer over the years, such as the status of Taiwan and claims to sovereignty of the Diaoyu/Senkaku Islands and other island reefs in the South China Sea. Therefore, the relationship between China and the United States is classified as the least close of the three categories in this preliminary study.

India is only coded as having an overall friendly-neutral relationship with the United States between 1994 and 2013. While it signed the "Agreed Minute on Defence Relations" in 1995 and the "New Framework for the U.S.-India Defence Relationship" in 2005,[78] these agreements indicate friendly relationships in the military and other domains, but are qualitatively different than actual mutual defence treaties some Asian countries have with the United States. The latter entail concrete obligations and benefits, not just voluntary defence or strategic cooperation.

Indonesia and Singapore are also coded as friendly-neutral. Like India, the United States considers these two countries "strategic partners," but not "major non-NATO allies (MNNAs)."[79] U.S. relationship with Indonesia has "improved dramatically" since its democratic developments in the early 2000s, while the "working defence relationship" with

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http://origin.www.uscc.gov/sites/default/files/Research/Backgrounder_China's%20Naval%20Modernization%20and%20Implications%20for%20the%20United%20States.pdf.

[77] Examples of such incidents during the period studied in this thesis include the Taiwan Strait Crises of 1995-96, the EP-3 incident in 2001, and quasi-military forces of China and Japan, Philippines confronting and harassing each other in East China Sea since early 2011.

[78] Chidanand Raighatta, "India, US Sign Defence Pact," Times of India, 29 June 2005, accessed 5 November 2015, http://timesofindia.indiatimes.com/world/us/India-US-sign-defence-pact/articleshow/1155838.cms.

[79] On U.S. "strategic partners" in the Asia-Pacific, see Bruce Vaughn, "U.S. Strategic and Defense Relationships in the Asia-Pacific Region," CRS Report for Congress, January 22, 2007, accessed 20 November 2015, 24, https://www.fas.org/sgp/crs/row/RL33821.pdf. On the list of U.S. major non-NATO allies, see "22 CFR 120.32 - Major non-NATO ally," Legal Information Institute, Cornell University website, accessed 20 November 2015, https://www.law.cornell.edu/cfr/text/22/120.32.

Singapore was "formalised" in 2005.[80] Both are put in the middling friendly-neutral category. Of course, this does not mean that India, Indonesia, and Singapore had exactly the same quality or closeness of relationship with the United States in the decade leading to 2013. It just means that their relationships belong to the same trichotomous level.

Japan, the Philippines, and South Korea are both MNNAs and formal allies and enjoy the closest type of relationship with the United States in the Asia Pacific. The formal defence treaties between the United States and Japan and with the Philippines were both first signed in 1951, and the one with South Korea was signed in 1953.[81] The relations between the Philippines and the United States seem to deteriorate rapidly after the President Duterte came to power in the Philippines in 2016, but that is beyond the scope of this study. Again, there was obvious difference in the quality of the relations these three countries had with the United State even before 2013, but it was small enough to group them within the same trichotomous level.

Thailand, too, is both a MNNA and a formal ally.[82] Its relations with the United States, however, has drifted. This has become obvious even to casual observers after Thailand's latest coup in May 2014,[83] but the decline of the relationship appears to have started gradually as far back as the final years of the Cold War.[84] There were improvements during periods of civilian rule, but this study categorises Thailand as only having a friendly-neutral relationship with the United States as of 2013.

Taiwan is a special case. The United States is not a formal ally or has even maintained an official diplomatic relationship with Taiwan since 1979. In the same year, however, the Taiwan Relations Act was enacted, which assures no non-peaceful resolution of the future of Taiwan, and U.S. arms sales and defence services to Taiwan.[85] In addition, the U.S. Code of Federal Regulations as is currently written, states that "Taiwan shall be treated as though

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[80] Vaughn, 24.
[81] Vaughn, 15.
[82] Ibid.
[83] For a quick review of the U.S.-Thai relationship after the 2014 coup, see Prashantha Parameswaran, "Exclusive: Managing the Strained U.S. Thailand Alliance – A look at ongoing efforts to manage Washington's oldest Asian alliance," *The Diplomat*, 16 December 2015, accessed 10 accessed 2016, http://thediplomat.com/2015/12/exclusive-managing-the-strained-us-thailand-alliance/.
[84] For a study on the beginning of the changing U.S.-Thai military and broader relationship at the beginning of the 1990s, see Kenneth Standley Harbin, "The Expanding Sino-Thai Military Relationship: Implications for U.S. Policy in Thailand" (Master Thesis, Naval Postgraduate School, 1990). For a report on the drift in the last years of the 2000s, see Shawn W. Crispin, "When allies drift apart," 14 February 2009, *The Asia Times*, accessed 10 April 2016, http://www.atimes.com/atimes/Southeast_Asia/KB14Ae01.html.
[85] Alexander Chieh-cheng Huang, "The United States and Taiwan's Defence Transformation," Brookings website, February 2010, accessed 20 November 2015, http://www.brookings.edu/research/opinions/2010/02/taiwan-defense-huang.

it were designated a major non-NATO ally."[86] Therefore, it too is put in the first category of relationship with the United States.[87] Table 3.9 below summarises the relations between the case-study polities and the United States, their salience of the external securitising context, as well as the resulting trust level scores throughout the period studied:

Polity	Relations with the United States 1994-2013	External Securitising Context Salience/Trust Score
China	neutral-conflictual	High/1
India	friendly-neutral	Medium/2
Indonesia	friendly-neutral	Medium/2
Japan	formal ally equivalent	Low/3
Philippines	formal ally equivalent	Low/3
Singapore	friendly-neutral	Medium/2
South Korea	formal ally equivalent	Low/3
Taiwan	formal ally equivalent	Low/3
Thailand	friendly-neutral	Medium/2

Table 3.9 Relationships with the United States, Salience of External Securitising Context, Trust Level Scores of Nine Case-Study Polities 1994-2013

2.4.4 Overall Trust in Oil Markets

Decision-makers' overall levels of trust in oil markets are calculated by adding the three sets of trust scores measured above. Table 3.10 below summarises all these results, with each component weighted equally. A higher trust score denotes a higher level of overall trust, with "3" being the lowest and "9" the highest possible overall score respectively.

Economy	Securitising Agent Coherence Trust Score	Domestic Securitising Context Trust Score	External Securitising Context Score	Overall Trust Score	Overall Trust Level
China	1	1.5	1	3.5	Low
India	1	1.0	2	4.0	Low
Indonesia	1	1.0	2	4.0	Low
Japan	2	2.5	3	7.5	High
Philippines	2	1.0	3	6.0	Medium
Singapore	3	3.0	2	8.0	High
S. Korea	1	2.5	3	6.5	High
Taiwan	1	2.5	3	6.5	High
Thailand	1	1.0	2	4.0	Low

Table 3.10 Numeric Representation and Level of Trust in Oil Markets in years leading to 2013

[86] "22 CFR 120.32 - Major non-NATO ally." Accessed 20 February 2017, https://www.law.cornell.edu/cfr/text/22/120.32.

[87] In spite of the fact that Vaughn's CRF report only describes Taiwan as having a "key strategic relationship" with the United States like Singapore, India, and Indonesia.

China, India, Indonesia, and Thailand had the lowest trichotomous overall trust in the oil markets in 2013 among the nine case-study economies. Among them, China had the lowest trust score. The Philippines had a medium level of trust and Japan, Singapore, South Korea, and Taiwan had a high level of trust, with Singapore again scoring the highest. The vulnerability-interaction model hypothesises that decision-makers' level of trust in the oil markets is the central ITV that binds the IV and the other ITVs together. Once a trust level is formed, however, the corresponding level of strategic oil supply measures can only be materialised if the polity possesses the requisite implementation capability. This brings us to the last ITV of implementation capability.

2.5 Implementation Capability

This section evaluates the case-study states' capabilities to implement strategic oil supply measures in 2013. To do this, I examine three components that make up the case studies' financial capabilities and one proxy presenting their diplomatic capability.[88] Finally, the degree of centralization of central government authority to effectively make use of the implementation capability is factored into consideration. Each of these components are detailed in the following three sub-sections. Figure 3.2 below provides a schematic representation of the construction of the overall trichotomous implementation capability level of each case-study economy.

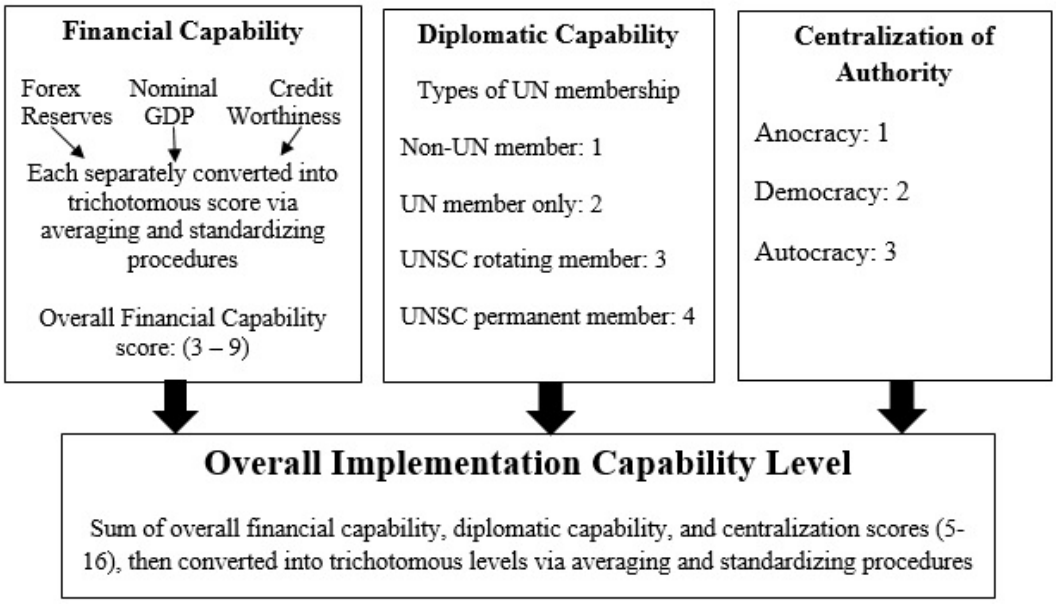

Figure 3.2 Construction of Overall Implementation Level

[88] In the current globalised and relatively liberalised era, this study simplifies this analytical task by not investigating polities' technical capabilities separately as countries with enough financial capabilities would be able to acquire the technology needed through means such as hiring foreign experts or setting up joint ventures with foreign companies which possess the technology.

2.5.1 Financial Capability

States need financial capability to implement both market-displacing and market-conforming strategic oil supply measures. Capital is needed to set up NOCs; overseas equity oil investments are capital-intensive and risky; constructing and filling up SPRs requires cash or cash equivalents. So how can states' financial capability to implement these measures be judged? The per capita GDP examined earlier point more to the level of economic development of the polity than the actual size of financial resources a state can mobilise or the ease with which resources can be put to use at any given time. Since almost all international oil transactions during the period studied are denominated in U.S. dollars, the size of states' foreign exchange reserves, especially those in U.S. dollars, would be a good way to gauge states' financial capability to implement strategic oil supply measures in the short to medium terms.[89]

Table 3.11 below lists the foreign exchange reserves of the nine case-study economies and their trichotomous levels. The higher the level of reserves an economy held in 2013, the higher the corresponding implementation score it receives.[90]

Economy	Foreign Exchange Reserves in 2013[91]	Trichotomous Reserves Level/Score
China	$3,880,000,000,000	High/3
India	$298,092,000,000	Medium/2
Indonesia	$99,387,000,000	Low/1
Japan	$1,267,000,000,000	Medium/2
Philippines	$83,182,000,000	Low/1
Singapore	$277,798,000,000	Medium/2
South Korea	$345,694,000,000	Medium/2

[89] China has settled oil transactions with Iran in renminbi before 2013, and both India and China acquired oil from the Soviet Union and Eastern European countries that were not paid in U.S. dollars during the Cold War. However, the overwhelming majority of oil supplied to the case-study economies during the period studied, including 2013, was denominated in U.S. dollars. See "China Buying Oil from Iran with Yuan," BBC website, 8 May 2012, accessed 10 February 2016, http://www.bbc.com/news/business-17988142; Also see Alastair Crooke, "The Non-Dollar Trading Is Killing the Petrodollar – And the Foundation of U.S.-Saudi Policy in the Middle East," The Huffington Post, 2 December 2014, accessed 10 February, http://www.huffingtonpost.com/alastair-crooke/petrodollar-us-saudi-policy_b_6245914.html.

[90] "Hoarding" of foreign exchange reserves enables states to provide low-interest loans to NOCs or to implement other strategic oil supply measures effectively in the short to medium terms, which is the time horizon of this study and likely that of most decision-makers. Studies suggest that, however, such behaviour may weaken the overall financial sector of the economy in the long run. It may also engender "competitive hoarding" and lowering of exchange rates of economies, especially those with similar export markets. See Jaewoo Lee and Joshua Aizenman, *Financial versus Monetary Mercantilism: Long-run View of Large International Reserves Hoarding* IMF Working Papers 2006/280 (International Monetary Fund December 2006).

[91] The data source, except that of Taiwan, is from the World Bank website, accessed 11 December 2016, http://data.worldbank.org/indicator/FI.RES.TOTL.CD. The data source for Taiwan is from "The World Factbook," CIA website (estimated 2014 figure), accessed 11 February 2016, https://www.cia.gov/library/publications/the-world-factbook/fields/2188.html. Both websites stay that they count "gold, special drawing rights, reserves of IMF members held by the IMF, and holdings of foreign exchange under the control of monetary authorities" in "current U.S. dollars" in tallying the reserves amount.

Taiwan	$423,900,000,000	Medium/2
Thailand	$167,230,000,000	Medium/2

Table 3.11 Foreign Exchange Reserves of Nine Case-Study Economies in 2013

Short of quantitative easing or printing more money, two other common sources of financing a national government may draw on to implement strategic oil supply measures are various types of internal revenue and issuing sovereign bonds or borrowing.[92] This project, therefore, also incorporates economies' performance in these areas to measure their financial capabilities. The actual internal revenue available to a national government through taxation, fees, and even from its the sale of indigenous oil resources is closely linked to the actual size of the economy. The GDP of the case-study economies are used as a proxy of states' financial capability through internal revenue. Table 3.12 below lists the nominal GDP of the case study economies and their trichotomous GPD levels and scores. A higher score denotes a higher GPD level.

Economy	Nominal GDP in U.S. Dollars in 2013[93]	Trichotomous GPD Level/Score
China	$9,490,602,600,148	High/3
India	$1,861,801,615,478	Medium/2
Indonesia	$910,478,729,099	Medium/2
Japan	$4,919,563,108,373	High/2
Philippines	$271,927,428,133	Low/1
Singapore	$302,245,904,260	Low/1
South Korea	$1,305,604,981,272	Medium/2
Taiwan	$933,031,437,500	Medium/2
Thailand	$420,166,569,029	Low/1

Table 3.12 Nine Case-Study Economies' Nominal GDP in 2013

Apart from internal revenue and reserves, an economy can also issue sovereign bonds to raise funds. The absolute amount as well as the ease and cost a national government can borrow are contingent upon both the size of its economy as well as its credit worthiness, which is generated by taking into consideration a whole host of factors incorporated by a number of credit rating companies.[94] Table 3.13 below summarises the overall credit worthiness of the case-study economies by averaging the ratings given to them by three

[92] Printing more money is likely to devalue the currency and discount the actual financial capability of the country down the road anyway.

[93] The data source, except that of Taiwan, is from the World Bank website, accessed 12 February 2016, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD. The data source for Taiwan's 2013 figure is from "Real GDP at Constant National Prices for Province of China Taiwan," Economic Research of [U.S.] Federal Reserve Bank of St. Louis website, accessed 3 January 2017, https://fred.stlouisfed.org/series/RGDPNATWA666NRU.

[94] For a comprehensive understanding of these factors by major credit rating companies, the methodologies used, their pitfalls etc., see Ashok Vir Bhatia, "Sovereign Credit Ratings Methodologies: An Evaluation," IMF PWP02/170, October 2002, accessed 12 February 2016, https://www.imf.org/external/pubs/ft/wp/2002/wp02170.pdf.

major companies, S&P, Moody's, and Fitch." [95] These ratings are then translated numerically according to the International Monetary Fund (IMF) 24-point "transposition scale," with "1" denoting the most credit-worthy. [96] Therefore, the lower the IMF score an economy receives, the higher its trichotomous overall credit worthiness level and score will be.

Economy	S&P Rating	Moody's rating	Fitch Rating	IMF Scale Score	Trichotomous Overall Credit Worthiness Level/Score[97]
China	AA-	Aa3	A+	4.3	High/3
India	BBB-	Baa3	BBB-	10.0	Low/1
Indonesia	BB+	Baa3	BBB-	10.3	Low/1
Japan	AA-	Aa3	A+	4.3	High/3
Philippines	BB+	Ba1	BB+	11.0	Low/1
Singapore	AAA	Aaa	AAA	1.0	High/3
S. Korea	A+	Aa3		4.5	Medium/2
Taiwan	AA-	Aa3	A+	4.3	High/3
Thailand	BBB+	Baa1	BBB	8.3	Medium/2

Table 3.13 Nine Case-Study Economies' Credit-Worthiness as of 2013

The overall financial capabilities of economies are ascertained by combining their internal financial capability and the capability to obtain funds externally. Similar to the method used to obtain the overall trust in the oil markets' capability to adequately supply oil to these same polity, the three components of the financial capability scores shown in Tables 3.11, 12, and 13 above are added up to create the overall financial capability scores, with "9" being the highest and "3" the lowest possible score respectively. Table 3.14 below summarises these scores the nine case-study economies receive and their respective trichotomous overall financial capability levels in 2013:

Economy	Forex Reserve	Nominal GDP	Credit Worthiness	Overall Financial Capability Score	Trichotomous Overall Financial Capability Level
China	3	3	3	9	High

[95] The source of credit ratings by the three major rating companies is from "Credit ratings: how Fitch, Moody's and S&P rate each country," The Guardian website, last updated 3 January 2013, accessed 12 February 2016, http://www.theguardian.com/news/datablog/2010/apr/30/credit-ratings-country-fitch-moodys-standard.

[96] Bhati, 8. The table on this page gives a "translation" of the different letter grades with the – or + signs to 24 whole number grades. I have averaged out the grades if they are not totally equivalent to each other according to this IMF formulation, and hence resulting in some countries having a non-whole number grade.

[97] While the same averaging and standardising procedure is followed to generate these comparative levels, the medium level covers those 0.6 instead of 0.5 standardise deviation above and below the average IMF scale score. If this minor adjustment is not made, none of the nine economies would be considered having a medium level of credit worthiness.

India	2	2	1	5	Low
Indonesia	1	2	1	4	Low
Japan	2	3	3	8	High
Philippines	1	1	1	3	Low
Singapore	2	1	3	6	Medium
S. Korea	2	2	2	6	Medium
Taiwan	2	2	3	7	High
Thailand	2	1	2	5	Low

Table 3.14 Nine Case-Study Economies' Overall Financial Capabilities in 2013

2.5.2 Diplomatic Capability

Diplomatic capabilities refer to the ability to achieve diplomatic or political objectives in major international or regional fora either by supporting or withholding support to resolutions or other collective decisions.[98] The United Nations (UN) Security Council "rests at the heart of the international architecture."[99] It wields relatively great diplomatic power as it can impose sanctions, authorise the use of force to maintain or restore peace, make recommendation on the appointment of the UN Secretary-General, and elect judges of the International Court of Justice.[100] There are other diplomatic fora involving political entities in the Asia-Pacific, such as the Asia Pacific Economic Cooperation. None of them, however, covers the majority of exporting countries that supply oil to the region, which are supposedly the target recipients of diplomatic capability.

UN Security Council (UNSC) membership is, therefore, used as a proxy of diplomatic capability. Countries which are permanent members of the UNSC stay on the council for the indefinite future and possess what is termed the "double the veto" power.[101] Therefore, they are deemed as possessing the greatest diplomatic capability. Countries that are non-permanent or rotating UNSC members only serve a term of two years at a time and they do not possess any veto power by themselves.[102] During their tenure, however, non-permanent member countries do possess more power over general members of the UN. Political entities which are not UN general members have the least diplomatic clout. Table

[98] Some possible cases of such use of diplomatic capability in connection with Sudan and Iran that has been examined. Regardless the merit of individual claims, if an oil importing country is in possession of such diplomatic capability, there is always the possibility that it can use it accordingly upon consideration of the costs and benefits of its application.
[99] Fakiha Mahmood, "Power Versus the Sovereign Equality of States: The Veto, the P-5 and United Nations Security Council Reforms," *Perceptions*, 18-4 (Winter 2013), 117.
[100] "The Security Council," UN website, accessed 15 February 2016, http://www.un.org/en/sc/.
[101] This means they can both veto any "substantive" decisions discussed in the Security Council as well as determining which decisions are "substantive" or "procedural." Ibid., 126. Also see Hans Köchler, "The Voting Procedure in the United Nations Security Council – Examining a Normative Contradiction in the UN Charter and its Consequences on International Relations," 18-20. Accessed 15 February 2016, http://www.i-p-o.org/Koechler-Voting_Procedure-UN_Security_Council.pdf.
[102] "Charter of the United Nations – Chapter V," UN websites, accessed 15 February 2016, http://www.un.org/en/sections/un-charter/chapter-v/.

3.15 below summarises the results for the nine case study polities in 2013, "4" denoting the greatest and "1" the least capability:

Polity	UNSC Membership in 2013	Diplomatic Capability Score	Trichotomous Diplomatic Capability Level
China	Permanent	4	High
India	Non-Permanent[103]	3	High
Indonesia	None[104]	2	Medium
Japan	None	2	Medium
Philippines	None	2	Medium
Singapore	None	2	Medium
S. Korea	Non-Permanent[105]	3	High
Taiwan	Non-UN Member [106]	1	Low
Thailand	None	2	Medium

Table 3.15 Nine Case-Study Polities' Diplomatic Capability in 2013

2.5.3 Overall Implementation Capability

To ascertain the case studies' overall capability to implement oil supply capabilities as of 2013, this sub-section first combines their overall financial capability scores with their diplomatic capability scores to generate the overall implementation scores. Table 3.16 below recaps these scores and shows each case study's sum as its overall implementation capability score in 2013 and its corresponding overall implementation capability level, with "13" being the highest and "4" the lowest possible score respectively:

Polity	Overall Financial Capability Score	Diplomatic Capability Score	Overall Implementation Capability Score	Overall Implementation Capability Level
China	9	4	13	High
India	5	3	8	Medium
Indonesia	4	2	6	Low
Japan	8	2	10	High
Philippines	3	2	5	Low
Singapore	6	2	8	Medium
S. Korea	6	3	9	Medium
Taiwan	7	1	8	Medium
Thailand	5	2	7	Medium

[103] It is not one of the five permanent members (the United States, Russia, Britain, France, and China), but it is a non-permanent member in 2011-12. The years are very close to 2013 and would have an impact on its oil diplomacy immediately preceding 2013. See "Members of the Security Council in 2013," UN website, accessed 15 February 2016, http://www.un.org/en/sc/members/elected.asp.
[104] Indonesia and the five "none" cases were either permanent nor non-permanent members around 2013. Ibid.
[105] Ibid.
[106] Taiwan or the Republic of China has not been a UN member since 1971. For a history of its UN membership vis-à-vis that of China (People's Republic) and its diplomatic consequences, see Sigrid Winkler, "Taiwan's UN Dilemma: To Be or Not To Be," Brookings Institute website, accessed 15 February 2016, http://www.brookings.edu/research/opinions/2012/06/20-taiwan-un-winkler.

Table 3.16 Nine Case-Study Polities' Overall Implementation Capability in 2013

Finally, factoring in the concept of the centralization of authority to effectively mobilise the material capabilities an economy possesses, the nine case studies are categorised according to their regime types. The three designations of "autocracy," "democracy," or "anocracy" these polities received for 2013 are translated into trichotomous scores.[107] I argue that it is generally easier and faster for central-level decision-makers in autocracies to implement executive decisions as they do not have to be directly or formally accountable to other branches of government, such as an elected legislature or an independent judiciary.[108] Autocracies, therefore, receive the highest score that denotes the highest centralization of authority, "3." On the other hand, due to the supposedly unstable and inefficient nature of anocracies,[109] the opposite is true for them and they receive a centralization score of "1."[110] Democracies fall between the two. This reasoning only suggests the greater short-term capability of autocracies to execute strategic oil supply measures. It does not imply that autocracies are inherently stronger or more stable. Table 3.17 below shows the overall implementation scores after the degree of centralization of authority is factored in:

Polity	Overall Implementation Capability Score	Regime Type[111]	Centraliz-ation Score	Overall Implementation Capability Score with degree of centralization	Trichotomous Implementation Capability Level with degree of centralization
China	13	Autocracy	3	16	High
India	8	Democracy	2	10	Medium

[107] On the "Polity IV Individual Country Regime Trends, 1946-2013" webpage, polities are divided into seven regime types, but only four of them were assigned to the case-study polities in this project. They are: Full Democracy, Democracy, Closed Anocracy, and Autocracy. See http://www.systemicpeace.org/polity/polity4x.htm, accessed 13 February 2016. However, on the "About Polity" webpage, the Polity score regime types are categorised as "autocracies," "anocracies," and "democracies" only. This fits well with the trichotomous categorization of variables in this project and so are adopted. Basically, the categories of full democracy and democracy are merged. See http://www.systemicpeace.org/polityproject.html, accessed 13 February 2016.

[108] This argument does not contradict Kong and Andrews-Speed *et al*'s findings that there are multiple sources of energy policy decision making bodies in China. It only argues that if all things remain equal, an autocracy like China should be able to execute its capability more efficiently than a democracy like India or Japan.

[109] For a discussion of the characteristics and characterization of these regime types by the Polity IV project, including anocracies, see Monty G. Marshall and Benjamin R. Cole, *Global Report 2014 – Conflict, Governance, and State Fragility* (Vienna, VA: Center for Systemic Peace, 2014). 20-22.

[110] Among the case-study polities, Singapore is the only one designated as an anocracy in 2013 by the Polity IV project. This appears to be contradictory to the common impression of the very high efficiency of the Singaporean government. Singapore is apparently an anomaly among anocracies in other regards as well. It is also the only non-democracy that receives a "fragility score" of 2 or lower, which speaks for its relative stability. Ibid., 49-51.

[111] Only three case-study countries' regime types in 2013 are slightly simplified from their designation on the Polity IV website: both Japan and Taiwan are originally designated "Full Democracy," while Singapore "Closed Anocracy." See "Polity IV Individual Country Regime Trends, 1946-2013," http://www.systemicpeace.org/polity/polity4x.htm.

Indonesia	6	Democracy	2	8	Low
Japan	10	Democracy	2	12	High
Philippines	5	Democracy	2	7	Low
Singapore	8	Anocracy	1	9	Medium
S. Korea	9	Democracy	2	11	Medium
Taiwan	8	Democracy	2	10	Medium
Thailand	7	Democracy	2	9	Medium

Table 3.17 Case-Study Economies' Overall Capability Incorporating Degrees of Centralization as of 2013

A comparison between the far right columns of Tables 3.16 and 3.17 shows that the trichotomous implementation capability levels of the nine case-study polities remain the same with or without incorporating the centralization scores. This does not mean that the degree of centralization of authority is superfluous to states' capabilities to implement strategic oil supply measures. The distribution of the attributes and capabilities of these nine case-study economies in 2013 just happens to render these comparative trichotomous levels the same with or without factoring in the degree of centralization of authority of their national governments.[112]

China had the highest financial as well as diplomatic capabilities in 2013 among the nine case-study economies. It was also the only one coded as an autocracy and so received the highest centralization score. Therefore, it had a high overall implementation capability level and its overall implementation score was considerably higher than Japan's, the only other case study that reached a trichotomously high implementation capability.

India, Singapore, South Korea, Taiwan, and Thailand all had a medium implementation level. South Korea had the highest overall implementation score among these five, with India and Taiwan following closely behind. Taiwan's unusually low diplomatic capability score and Singapore's relatively small economy in absolute terms prevented them from scoring higher, but even adding one more point to their respective overall scores would not have changed their trichotomous capability level. Indonesia and the Philippines had a low implementation capability level, mainly due to their unimpressive financial capabilities.

The results of this ITV used to examine the validity of the H1 to H4 in this plausibility probe, as shown on Table 3.17, appear to match the general expectation of the actual capabilities of these polities as of 2013. China was the most powerful, followed by

[112] Singapore's trichotomous overall implementation capability level with the degree of centralization factored in would remain unchanged as medium among these same case-study polities, even if its centralization score is changed to that representing either democracy or autocracy. If Singapore is coded as either an autocracy or a democracy, however, Thailand's overall implementation capability would be downgraded to "low," but the levels of all the other polities would remain the same. See the calculation of all three scenarios in Table A4, Appendix B.

Japan, South Korea, and then India. The Philippines was the least capable among this cohort, followed by Indonesia. Evidence more specific to the implementation capability of strategic oil supply measures is analysed in cases chosen for in-depth investigations in Chapters Four and Five.

3. Preliminary Results of Cross-Case Study

The results of the plausibility probe in the previous section show that the overall validity of H1 and H2 with 2013 data reaches 67%. These preliminary results show good support to the vulnerability-interaction. Section 5 as well as the concluding section of this chapter more comprehensively review the overall validity of the model and compares it to theories adopting the Realist/geopolitical perspective.

Table 3.18 below summarises the trichotomous levels of all the variables, that is DV, IV, and all three ITVs of the nine case-study economies in 2013:

Economy	DV Level	OV (IV) Level	Strength of Private Capital	Overall Trust in Oil Markets	Overall Implementation Capability
China	High	Low	Low	Low	High
India	**Medium**	**Low**	**Low**	**Low**	**Medium**
Indonesia	High	Low	Medium	Low	Low
Japan	Medium	High	High	High	High
Philippines	Low	Medium	Medium	Medium	Low
Singapore	Low	High	High	High	Medium
S. Korea	Medium	Medium	Medium	High	Medium
Taiwan	High	Medium	High	High	Medium
Thailand	**Medium**	**Low**	**Low**	**Low**	**Medium**

Table 3.18 Trichotomous Levels of All Variables for Nine Case-Study Economies in 2013

Among the 36 paired comparisons generated from the nine case-study economies, one pair, India and Thailand (bolded in Table 3.18), has the parameters of H1, that is, all four explanatory variables having the same level. Their DV levels are also the same, which is congruent with the expectation of H1.[113]

The parameters of H2 call for different levels in one of the four explanatory variables only. Five pairs of economies emerge with this condition.[114] Three out of these five pairs, that is 60% of the cases, are congruent with the expectation of H2: the only explanatory variable that had a substantive difference in level explained the substantive difference in the pair's DV levels. Table 3.19 below summarises the data for these five pairs of economies:

[113] For a complete list of all 36 pairs comparisons and the differences in their explanatory factors and DV levels, see Table A5 in Appendix B.
[114] Ibid.

Five Pairs of Economies Having Different Levels in One Explanatory Factor Only:		
Economies	**Difference in DV**	**Congruent with model?**
China and India	One Level	Yes
China and Thailand	One Level	Yes
Japan and Singapore	One Level	Yes
Singapore and Taiwan	Two Levels	No
South Korea and Taiwan	One Level	No

Table 3.19 Economies Having Different Levels in One Explanatory Factor Only in 2013

The only difference in the four explanatory variables between China and India is that China has a higher implementation capability. As predicted by H2, China indeed adopted a higher level of strategic oil supply measures than India in 2013. The same is true for the pair of China and Thailand. The only difference in the four explanatory variables between Japan and Singapore is that Japan had a higher implementation capability. Congruent with the expectation of H2, Japan adopted a higher level of strategic oil supply measures than Singapore in 2013. Taiwan had a lower OV level than Singapore as of 2013, but it adopted two levels higher of strategic of supply measures. Therefore, this pair of cases are incongruent with the expectation of the reasoning of the vulnerability-interaction model. In the cases of Taiwan and South Korea, the freer Taiwanese economy did not lead it to adopt to a lower level of strategic oil supply measures than South Korea did. The results of both pairs suggest that Taiwan is the source of incongruity to the model. It appears to have an unusually high DV level relative to the levels of its explanatory factors among the case-study economies.

The overall congruence rate of the cross-case dimension of the first layer of the vulnerability-interaction model reaches 67%. A total of six pairs of economies emerge with the parameters stipulated in H1 or H2. One pair, India and Thailand, has all variables at the same level and so is congruent with the expectation of H1. Five pairs fulfill the conditions of H2. Three of the five pairs, or 60% of the cases, are congruent with the expectation by H2.

4. Cross-Temporal Comparisons of H1 and H2

The first layer of the vulnerability-interaction model explains changes in outcomes both across economies and over time. Section 2 of this chapter presents a preliminary cross-case study of H1 and H2. This section focuses on the cross-temporal dimension of these two hypotheses. Data for year 2003 is chosen for comparison with those in 2013. Oil prices were relatively low in the decade immediately preceding 2003. They trended upward in the next decade with only a slight dip during the great financial crisis of 2009 and 2010. Many strategic oil supply measures, including the two used to make up the DV value in this study,

have relative long time lags in implementation. Therefore, comparing the values of the variables in 2003 with those in 2013 offers an opportunity to observe the extent oil prices, factored in the OV calculations of economies, may impact on policymakers' decision to implement strategic oil supply measures.

Table 3.20 below summarises changes in the values as well as levels of all the variables in the nine within-case studies and the preliminary cross-temporal validity of H1 and H2, using the same nine case-study economies in the cross-case study in Section 2. Changes to the values of the variables up to ±10% from 2003 to 2013 is considered having the same trichotomous level.[115]

Economy	DV Level	OV (IV) Level	Private Capital Strength	Trust in Oil Markets	Implementation Capability
China 2003	49.78	16.26	56.25	3.00	15.00
China 2013	54.22	23.18	58.45	3.50	16.00
% changed	**(+8.92%) 4.44**	**(+42.56%) 6.92**	**(+3.91%) 2.20**	**(+16.67%) 0.50**	**(+6.67%) 1.00**
Probably Congruent	**Same**	**Higher**	**Same**	**Higher**	**Same**
India 2003	24.15	27.17	57.75	4.00	9.00
India 2013	22.64	28.15	60.90	4.00	10.00
% changed	**(-6.25%) -1.52**	**(+3.61%) 0.98**	**(+5.45%) 3.15**	**0.00**	**(+11.11%) 1.00**
Probably Congruent	**Same**	**Same**	**Same**	**Same**	**Higher**
Indonesia 2003	105.56	12.51	56.55	4.00	8.00
Indonesia 2013	63.06	21.90	65.10	4.00	8.00
% changed	**(-40.26%) -42.5**	**(+75.06%) 9.39**	**(+15.12%) 8.55**	**0.00**	**0.00**
Probably Incongruent	**Lower**	**Higher**	**Higher**	**Same**	**Same**
Japan 2003	28.83	40.80	68.15	8.00	12.00
Japan 2013	28.83	38.80	73.70	7.50	12.00
% changed	**0.00**	**(-4.90%) -2.00**	**(+8.14%) 5.55**	**(-6.25%) -0.50**	**0.00**
Congruent	**Same**	**Same**	**Same**	**Same**	**Same**
Philippines 2003	1.28	38.82	62.55	5.50	7.00
Philippines 2013	2.50	33.91	65.40	6.00	7.00
% changed	**(+95.31%) 1.22**	**(-12.65) -4.91**	**(+4.56) 2.85**	**(9.09%) 0.50**	**0.00**
Incongruent	**Higher**	**Lower**	**Same**	**Same**	**Same**
Singapore 2003	0.00	48.04	86.95	8.00	10.00
Singapore 2013	0.00	47.66	86.65	8.00	9.00
% changed	**0.00**	**(-0.79%) -0.38**	**(-0.35%) -0.30**	**0.00**	**(-10.00%)-1.00**
Congruent	**Same**	**Same**	**Same**	**Same**	**Same**
S. Korea 2003	14.48	39.18	68.90	6.50	11.00
S. Korea 2013	38.39	36.44	71.55	6.50	11.00
% changed	**(+165.12%) 23.91**	**(-6.99%) -2.74**	**(+3.85%) 2.65**	**0.00**	**0.00**
Incongruent	**Higher**	**Same**	**Same**	**Same**	**Same**
Taiwan 2003	64.00	37.59	71.30	6.50	10.00

[115] I argue that a total 20% movement (±10%) within each trichotomous level on a 100% scale is reasonable since it is well within the 33% boundaries of three evenly distributed groups.

Taiwan 2013	47.00	35.36	76.15	6.50	10.00
% changed	**(-26.56%) -17.00**	**(-5.93%) -2.23**	**(+6.80%) 4.85**	**0.00**	**0.00**
Probably Congruent	**Lower**	**Same**	**Same**	**Same**	**Same**
Thailand 2003	44.39	31.89	64.85	4.50	8.00
Thailand 2013	27.39	28.11	64.60	4.50	9.00
% changed	**(-38.30%) -17.00**	**(-11.85%) -3.78**	**(-0.39%)- 0.25**	**0.00**	**(+12.50) 1.00**
Probably Congruent	**Lower**	**Lower**	**Same**	**Same**	**Higher**

Table 3.20 Nine Within-Case Comparisons of DV, OV, and ITV Levels in 2003 and 2013

The table above shows that Japan and Singapore are congruent with the expectations of H1. China, India, Taiwan, and Thailand are also likely to be congruent to the reasoning of the proposed model. Indonesia, the Philippines, and South Korea are incongruent, with South Korea being the truly deviant case. The results of each of these within-case studies are further discussed below.

All four explanatory variables as well as the DV levels of Japan and Singapore between 2003 and 2013 remain unchanged. Therefore, their situations match the expectations of H1. Japan's slightly lower "trust in oil markets" score in 2013 is the result of its slow per capita GDP growth compared to some of the fast rising ones among its Asian cohorts. Japan's relatively lower GDP growth in turn lowers its domestic context trust score slightly. If this had any bearing on policymakers' decision in intervening in the economy's oil supply, the effect was likely neutralised by the greater economic freedom of the country, and hence the greater strength private capital attained. It appears that the aggressive energy conservation and energy efficiency measures implemented over the decade and especially after the shutdown of nuclear power plants in Japan after 2011 have successfully contained the potential rise in oil consumption caused by the nuclear disaster.[116]

Singapore's lower overall implementation capability (but still within the same trichotomous level as defined in this study) is due to a drop in its diplomatic capability score as it no longer held the UNSC rotating membership in the decade leading to 2013.[117] The very high historical-institutional economic freedom built in the system of Singapore, as

[116] There was a small spike in the oil consumed in Japan in the immediate aftermath of the nuclear disaster, that is from 2011 to 2012 (6.6% or from 203.6 to 217 million tons – MT). Japan's oil consumption, however, continued to drop in the years since: 208MT in 2013, 197.3MT in 2014, and 189.6MT in 2015. See *BP Statistical Review of World Energy June 2016*, 11. Accessed 10 December 2016, https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf.

[117] It was a UNSC non-permanent member between 2001 and 2002. See "Countries Elected Members of the Security Council," United Nations website. Accessed 2 December 2016, http://www.un.org/en/sc/members/elected.asp.

confirmed by the almost non-existent strategic oil supply measures it adopted by 2003,[118] renders this drop in potential oil diplomacy capability irrelevant.

The 2003 and 2013 situations in China appear to be concordant with the reasoning of the vulnerability-interaction model. China's OV increased considerably over the decade studied due to its rapid decline in oil self-sufficiency rate. The effect the increased OV had on the DV, however, would be somewhat tempered by the slightly greater economic freedom, and hence greater strength of private capital, and its higher trust level in oil markets. China's higher urbanization rate and per capita GDP boosted its domestic context trust score, and hence its overall trust score. Of course, these increases are small compared to that of the OV. The DV value, therefore, did end up higher. The higher DV value was due to the larger size of its SPR over the decade. The high baseline control (100%) the Chinese state had over the oil supply to the economy in and before 2003 also contributes to the relatively small increase in its DV value in 2013. The slight increase in China's implementation capability in this study was due to its improved credit-worthiness.

At first glance, India's situation is incongruent with the expectation of H2. The trichotomous levels of only one of the four explanatory factors, implementation capability, slightly increased over the decade. According to H2, the DV level should also change in the direction predicted by the reasoning of the vulnerability-interaction model. In this case, the DV level should have gone up, not remaining at the same level. Upon closer examination, India's case is in fact congruent to the spirit, if not the letter, of the proposed model. The source of the slight increase in its implementation capability is its two-year UNSC rotating membership in the years leading to 2013.[119] This is a relatively fleeting boost in diplomatic capability. In the meantime, its overall economic freedom, and hence private capital strength, increased slightly (but stay within the same trichotomous levels). The same is true for its OV. The fact that its DV value was slightly lower and again stayed within the same trichotomous level suggests that India's freer overall economy had a greater impact on the strategic oil supply measures adopted. Indeed, the slightly lower DV value was due to the slightly lower percentage of government ownership in India's NOCs. The divestment process was very slow, but did move forward. The more market-conforming strategic oil supply measure of building an SPR, which had been discussed for a long time, has not materialised by 2013, which is a testament to India's relatively low overall implementation capability.

The situation of Taiwan is similar to India, but in relation to H1. Its four explanatory variables remain at the same trichotomous levels, but its DV level was lower, apparently

[118] It scored zero on the strategic oil supply indicator in 2003 as the state has already sold off its ownership in its NOC, the Singapore Petroleum Company, and did not hold any SPR.
[119] See footnote 102 above.

incongruent to the expectation of H1, which states that the DV level should remain the same under such a circumstance. Again, upon closer examination, the situation does not seem that incongruent any more. The vulnerability-interaction model posits that both the slight increase in economic freedom and decrease in OV would lower the strategic oil measures a state would adopt. The disproportionally large decrease in Taiwan's DV value reflects its relatively fast downstream oil sector liberalization over the decade, thus lowering the percentage of crude oil supplied to the economy by its NOC, the CPC Corporation.

In the case of Taiwan, neither its higher economic freedom nor its lower OV was large enough by themselves to change to a different trichotomous level. Since these two changes are both hypothesised to lead to the adoption of fewer strategic of supply measures, or a lower DV, together, the DV reading of Taiwan dropped enough to a trichotomously lower level. Taiwan's case, therefore, is congruent to the spirit of the vulnerability-interaction model and points to a way to refine its prediction. Taiwan's case suggests that when two or more explanatory variables change in a direction that is supposed to contribute to the same direction of change in the DV, they would interact to produce a larger effect on the DV than the degrees of change in the individual explanatory variables.

The liberalisation of the Thai oil sector also led to a considerably lower DV value of the country over the same period, but through a lower percentage of government ownership in the Thai NOC PTT. Two of Thailand's explanatory factors changed levels and so the vulnerability-interaction model is not specified enough to predict the interaction effects of the changes. Still, it can be reasonably argued that Thailand's situation appears to be congruent to the spirit of the model. Thailand's lower OV is a combination of a 74% increase in indigenous oil production and its GDP rise, which lowered the per capita import cost of oil into the Thai economy. The impressive increase in oil production was at least partially caused by its oil sector liberalisation. Thailand's implementation capability increased because its foreign exchange reserves almost quadrupled in 10 years. Similar to, but to a greater extent than, the case of India, a slight increase in capability without any change in the overall trust level in the oil markets, does not seem to have much impact on the Thai DV level. Consistent with the reasoning of the vulnerability-interaction model, in the case of Thailand, the drop in OV level is the decisive factor.[120]

4.1 Within-Case Studies Inconsistent With Cross-Temporal Expectations of H1 and H2

A higher level of overall economic freedom should lower the country's DV level while an increase in OV level should have the opposite effect. The effect on the DV when

[120] In the case of India, the increase in OV is very small and there is a greater, although still small, increase in overall economic freedom which would have a countervailing effect.

both of these conditions occur at the same time cannot be specified at this point. Indonesia's OV increased more than 75% over the decade. In fact, with an OV value of just over "12" in 2003, Indonesia had barely become a net oil importing economy as defined by this study.[121] Such an increase should raise the DV level of the country, even with the country's freer economy.[122] Instead, there is a considerable decrease in Indonesia's DV value. At first glance, therefore, it should be considered incongruent with the reasoning of the proposed model.

The main source of the dramatic increase in Indonesia's OV is its simultaneously lower oil production and higher oil consumption. Ironically, these same dynamics also lead to the decrease in the DV level in the unique case of Indonesia. The state continued to have a 100% control in the country's crude oil supply through the state monopoly in refining capacity. Indonesia, did not have a separate SPR. Instead, the same operating stock of 20-day oil demand kept by its NOC is counted as the country's "SPR" in both 2003 and 2013. With the country's much lower oil self-sufficiency rate in 2013, however, the same 20-day worth of demand stock was equivalent to only 47 days oil import amount versus the 200-day equivalent in 2003.[123] In fact, within the parameters of this preliminary study, the only way Indonesia could have increased its DV value would be to either build a large SPR or mandate a much higher operating stock of its NOC. It appears that neither was within the capability of the country.

On the surface, the case of the Philippines is incongruent with the expectation of H2. Among the four explanatory factors, only its OV level changed. Its lower OV level should result in a lower DV level according to the expectation of H2. Instead, it shot up over 95%. As with Indonesia, this case is a little more complicated than it initially appears. First of all, the Philippines' slightly higher trust score as well as its slightly higher economic freedom score should lower its DV value. The Philippines' NOC became a less coherent oil securitising agent due to further liberalization of the Philippine oil sector, which has started in the 1990s when oil prices were low.[124] This slightly increased the country's overall trust score according to the reasoning of the proposed model. By 2009, after completely divested

[121] A net oil importing state is defined as one having an OV value of over 10. See footnote 71 in Chapter Two. For the calculation of Indonesia's and other case-studies' 2003 OV, see Table A8, Appendix B.
[122] The vulnerability-interaction model does not predict proportional changes in explanatory factors and DV values to begin with.
[123] As explained in section 2.1 in this chapter, it is the equivalent number of days of oil import that is used to calculate the size of an economy's SPR in this study as is also stipulated by the IEA.
[124] The privatization of major oil refining company in the Philippines, Petron Corporation started in 1994 and by 2003, PNOC owned 40% of it, while Saudi-Aramco, the NOC of a major oil producer, Saudi Arabia, owned another 40% and the public owned the remaining 20%. See *PNOC – The Energy Company – 1973 – 2003 30th Anniversary Report*, 23.

its shares in the country's major refinery, Petron, PNOC, the Philippine NOC no longer control the crude oil supply to the economy.[125]

Ironically, the Philippines' great increase in DV value was due to private oil firms' development of the indigenous resources, not greater direct control of it by PNOC or its upstream subsidiary PNOC EC. The greater amount of oil produced over the decade indirectly increased the government's theoretical "control" of them through the same 60% the government share of the oil developed.[126] In reality, the government likely only collected 60% of the proceeds from the oil developed, not take the oil in kind.[127] This increased production together with a simultaneously lower consumption caused a drop in the economy's OV.[128]

The case of South Korea is definitely incongruent with the expectation of H1. All of its explanatory factors remained at the same level over the decade, and H1 predicts that its DV should also remain the same. Instead, it shot up over 165% during the timeframe reviewed here. Unlike the cases of Indonesia and the Philippines, the increase in Korea's DV level appears to be due to active government actions to have greater control over the economy's oil supply and its upstream oil sector.[129] Both the oil developed by its NOC the KNOC and the size of its SPR, the two DV component measures used in this plausibility probe, increased considerably.[130] In the meantime, its overall economic freedom increased slightly and its OV slightly decreased. Both of these conditions are supposed to lower the value, if not the level, of its DV. The situations of South Korea during the period studied, therefore, present a true deviant case not only to the cross-temporal applicability of H1, but also among the nine case-study economies.

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[125] "Our History," Petron website. Accessed 12 October 2016, http://www.petron.com/about-history.html. Also see Elizabeth Sanchez-Lacson and Abigail L. Ho, "San Miguel tightens grip on Petron," *Philippine Daily Inquirer* December 24, 2008. Accessed 12 October 2016, http://archive.is/IDGC.

[126] That is how the Philippines' state control of oil supply was calculated in this study. See Table 3.1 above and Table A8, Appendix B.

[127] See Section X of the Philippine Department of Energy model petroleum service contract, which discusses these two possibilities regarding the proceeds of oil production.

[128] It is unclear whether conservation measures, unaffordability or other unknown reasons caused the drop in oil consumption in the Philippines over the decade studied.

[129] This apparently is inconsistant with the "Low carbon, Green Growth" and "market-based" approach declared in South Korea first national energy plan in 2008. See Woo Jin Chung, "Update on ROK Energy Sector and Energy Policies," Nautilus Institute and Korea Energy Economics Institute, 22 July 2014, 1.

[130] KNOC produced about 9% of oil consumed in South Korea in 2012-13 and about 1.7% in 2005, which is the closest year to 2003 figure located. See *KNOC Annual Report 2013*, 18 and *KNOC Annual Report 2005*, 15. The size of its SPR was equivalent to about 122 days of demand (which is almost the same as import in the case of South Korea) in 2013 and about 49 days in 2003. For the 2013 figure, see *Energy Supply Security – Emergency Response of IEA Countries 2014* (Paris: International Energy Agency, 2014), 296. For the 2003 figure, see Eui-Soon Shin, "Joint Stockpiling and Emergency Sharing of Oil: Update on Situations in the ROK and on Arrangements for Regional Cooperation in Northeast Asia," (Powerpoint presented at the Asian Energy Security Workshop May 13 -16, 2005, Beijing China), Slide 14.

This chapter's concluding section applies alternative theories to see if any of them better explain the case of South Korea as well as other cases in the plausibility probe. The following section summarises the overall plausibility of the different dimensions and hypotheses of the vulnerability-interaction model.

5. Overall Validity of Vulnerability-Interaction Model

This chapter has employed structured and focused comparisons to examine all the variables of the vulnerability-interaction model in nine case-study economies to preliminarily probe its plausibility before exerting more intensive effort to investigate a few more promising cases relevant to further development of the model. The data show that overall the model is plausible and worthy of further investigation of its validity and refinement in the following chapters as described below.

2.2 Validity of H1 and H2

The first layer of the vulnerability-interaction model is designed to answer the first research question of what explains the variations in the levels of strategic oil supply measures adopted by the oil importing economies. The cross-case dimension of H1 and H2 specifically tries to explain the variations among these economies at the same period of time. The overall cross-case validity of H1 and H2 is 67% with 2013 data.

As discussed in Section 3 above, the pair of economies that has all four explanatory factors (IV & ITVs) at the same levels in 2013 is India and Thailand. These two economies also have the same level of DV. Therefore, they match the parameters of H1 and are selected to conduct an in-depth investigation of the cross-case validity of H1 in Chapter Four of this thesis. There are great differences between India and Thailand, including the relative sizes of their populations, land areas, and economic conditions, as well as other possible factors that may explain the levels of strategic oil supply measures they adopted. The similar results of all the levels of all their variables as presented on Table 3.18, therefore, fits the requirements of the most different research design.[131]

Five paired comparisons emerged with the parameters of H2, that is, only one pair of the four explanatory variables has different levels. Three of these five pairs, or 60% of the cases, have DV levels consistent with the reasoning of the vulnerability-interaction model as detailed Table 3.19 above. The cross-case dimension of H2 alone, therefore, has a congruence rate of 60%.

[131] For a discussion of how the "most different" research design expands the applicability of controlled comparisons, see George and Bennett, 164-165. For a discussion of the "least likely" cases, see John Gerring, "Is There a (Viable) Crucial-Case Method?" *Comparative Political Studies*, 40-3 (March 2007), 233-237.

Among these three pairs of candidates, China and India are the best cases to further investigate the cross-case validity of H2 in Chapter Four. First, as pointed out earlier, H2 suggests the one differing explanatory factor would demonstrate the logic of the proposed model. Therefore, it would be easier to examine this if both the DV and explanatory factor levels of the economies concerned are greater. Although all candidate pairs listed in Table 3.19 only have a one- but not two-level difference in their respective explanatory factor, the extents of the actual differences between the scores of the explanatory factor in question do vary. As indicated in Table 3.21 below, China and India have the greatest difference in their DV values among the three pairs of economies with outcomes that are congruent with the propositions of the vulnerability-interaction model, which are in boldface. Although the difference between the explanatory variable between China and Thailand is greater than that between China and India, China and India are more similar in a number of aspects than the other pairs. The absolute sizes of China and India's economies, populations, and geographic areas, for example, are relatively similar. This would minimise the number of confounding factors that may have a bearing on their DV levels, which serves to further the conditions for a "most similar cases" comparison inherent in the logic of H2.

Economies Having One-Level Difference in One Explanatory Factor Only:		
Economies	**Standard Deviation in DV**	**Standard Deviation in Explanatory Factor**
China and India	**1.46**	**2.25**
China and Thailand	**1.24**	**2.63**
Japan and Singapore	**1.33**	**1.23**
Singapore and Taiwan	2.17	1.51
South Korea and Taiwan	0.40	0.52

Table 3.21 Difference in DV and Explanatory Factor by Standard Deviation Among H2 Candidate Pairs in 2013

5.1.1 Cross-Temporal Validity of H1 and H2

The vulnerability-interaction model posits that the same explanatory variables should also explain variations of the level of strategic oil supply measures adopted within the same economy over different periods. H1 and H2, therefore, also have a cross-temporal dimension. Section 4 tests this dimension with nine within-case studies with 2003 and 2013 data. Four of the nine cases, Japan, Singapore, South Korea, and Taiwan emerge with H1 parameters. Japan and Singapore had the same DV level over the decade studied and so are congruent with the expectation of H1. South Korea had a higher DV level and is a deviant case. Taiwan's case appears to be consistent with the spirit, but not the strict conditions of H1 as it has a lower DV level. Even without counting Taiwan, the cross-temporal congruence rate of H1 is still 50%.

In contrast, India has a higher implementation capability in 2013, but its DV level remains the same. Therefore, it appears to be incongruent with the expectation of H2 as the vulnerability-interaction model suggests that a higher capability should result in a higher DV level if everything else remains the same. Similarly, the Philippines has a lower OV, but a higher DV in 2013. It is, therefore, incongruent with the expectation of H2 as the proposed model suggests a lower OV would lead to a lower DV. Overall, if we take the strict literal interpretation of H2, the cross-temporal dimension of it has a zero congruence rate. If a more relaxed view is taken, India's case should easily be considered congruent to its expectation and hence 50% of the cases are congruent. Due to the constraints of time and space of this thesis, further examination of the cross-temporal validity of H1 and H2 will be left for future research.

5.2 Validity of H3 and H4

The second layer of the vulnerability-interaction model addresses the second research question of what causes net oil importing states to adopt a high level of strategic oil supply measures during a period the international oil markets have been well established and domestic oil governance is generally being liberalised. This layer generates H3 and H4 as re-stated below:

H3: A net oil importing economy that has adopted a high level of strategic oil supply measures would have a high capability, high OV, high-strength private capital, and a medium level of trust in oil markets (three-high case)

H4: A net oil importing economy that has adopted a high level of strategic oil supply measures would have a high capability, a noticeable OV, and must NOT have high trust in oil markets, nor high-strength private capital (non-three-high case)

Each of these hypotheses proposes a unique causal pathway (INUS cause) that would lead to the adoption of a high level of DV. As discussed in Chapter Two. The vulnerability-interaction model also hypotheses a "third" pathway that would lead to the adoption of a high DV. This pathway is the one of the two "extreme" cases discussed in Chapter Two. An economy having a high OV, a low trust in the oil markets, a high capability, and that in which private capital is weak versus the state is hypothesised to also adopt a high level of strategic oil supply measures.[132] In spite of the mostly comparative nature of the levels of variables generated in the first layer in this plausibility probe, the summary of the variable levels shown on Table 3.18 does provide a sound basis for the

[132] A more careful examination of this "extreme" pathway shows that it is actually a variant of non-three-high case as proposed by H4, but before all the compressions are made. The "extreme case" for the adoption of a low or no DV (low OV, high trust, low capability, and high-strength private capital) does not emerge with 2013 data of the nine case-study economies.

levels of these variables on a larger scale. Since the Asia-Pacific has a relatively low oil self-sufficiency globally, we may modify the search of such "extreme cases" to include all the economies having both high and medium OV levels. [133] Still, none of them fit the descriptions of this third pathway. Therefore, we should proceed to search for cases that may fit the parameters of H3 and H4.

There are three economies that are shown to have a high DV level in 2013 on Table 3.18: China, Indonesia, and Taiwan. We can safely assume that net oil importing economies having a DV in the Asia-Pacific would also have a high DV by global standards. Hughes' *Globalizing Oil* documents the liberalising trend in oil governance in 15 advanced industrialised countries between 1985 and 2005. The average percentage of state ownership of oil firms compiled with those data is only about 19%.[134] It is likely that this number has dropped further by 2013 with the continuing liberalisation trend in those countries. Besides, the United States is not included in that 15-country study. Otherwise, the overall result would be further lowered. The results of the similar, but not exactly the same, component of China, Indonesia, and Taiwan in this study in 2013, as shown on Table 3.1 above, are 99%, 100%, and 44% respectively. They, therefore, can be considered having a high DV by almost any standards.

5.2.1 Validity and Case Selection of H3

Taiwan is selected to further assess the validity of H3 as a possible three-high case. The rest of this sub-section justifies this selection. To fit the criteria of H3 or the three-high cases, apart from having a high level of DV, economies also need a high OV, high capability, high-strength private capital as manifested as having a high degree of overall economic freedom, and a medium level of trust in oil markets. None of the nine case-study economies in this plausibility probe with 2013 data fits all four stipulations. In view of the generally high OV level among net oil importing states in the Asia-Pacific, the next logical step is to examine if any of the economies deemed to have a medium OV would satisfy the remaining criteria of H3. These three economies are the Philippines, South Korea, and Taiwan. Taiwan has already been determined to have a high DV. Since the Philippines only had a low DV level, it is eliminated for consideration. South Korea, like Japan, which already had a high OV, only had a medium, not high DV. Table 3.22 below summarises the situation of these four candidates:[135]

[133] The oil self-sufficiency rate of the Asia-Pacific in 2013 was 27.7%, versus North America's 76.26% and Europe and Eurasia's 95.32%. See Table 5.1 in Chapter 5 for details.
[134] Hughes' *Globalizing Oil.* 243-247. See Table A6, Appendix B for the calculation of the average of the 15 advanced industrialised countries.
[135] As further discussed below, the other high-DV economy China, fits the stipulations of H4 or the non-three high cases and hence is excluded from consideration as an H3 candidate here.

Economy	DV Level	OV (IV) Level	Strength of Private Capital	Overall Trust in Oil Markets	Overall Implementation Capability
Perfect Fit (Three-High Case)	**High**	**High**	**High**	**Medium**	**High**
Indonesia	High	Low	Medium	Low	Low
Japan	Medium	High	High	High	High
South Korea	Medium	Medium	Medium	High	Medium
Taiwan	High	Medium	High	High	Medium

Table 3.22 2013 Variable Levels of Candidates for In-Depth Investigation of H3 Against Perfect Fit

The variables not concordant with the perfect fit of the criteria of H3, as listed on the second row of the table, are shaded in two different weights, signifying different degrees and aspects of incongruity. The darker shading represents further away from the expectation of H3. First, none of the four candidates had medium level of overall trust in oil markets as stipulated in H3. Trust in the oil markets is likely to encompass components beyond the ones used in this plausibility probe. Therefore, the level of trust is put aside for now to ascertain if one of the candidates is a better fit than the other two.

Once the variable of trust is temporarily disregarded, Japan appears to be a promising candidate as the only other issue is that it had is having a medium, not a high DV. Can its medium DV among the other Asia-Pacific case-study economies be reasonably understood as a high level globally? As shown on Table 3.4, Japan's DV score with the preferred weighting method is 28.83 in 2013. The lowest "high" level DV score of the same weighting method in this plausibility probe is 47, received by Taiwan.[136] A yardstick that extends beyond the current study would be the score the United States would receive using the same proxies, which is about 38.[137] While the DV score of the United States is not low, most would agree that it does not fit the profile of a state that implements a high level of strategic oil supply measures globally.[138] Based on the lowest of the "High" category score received by Taiwan and the score of the United States, Japan cannot reasonably be said to have implemented a high level of strategic oil supply measures in 2013. Therefore, it is deselected as an in-depth case study to assess the validity of H3.

[136] See Table 3.4.

[137] The percentage of government control of crude oil supply to the United States is 0. While the amount of SPR fluctuates somewhat, as of 2015, that amount is 137 days of import equivalent (See "SPR Quick Facts," U.S. Department of Energy website, accessed 20 March 2016, http://energy.gov/fe/services/petroleum-reserves/strategic-petroleum-reserve/spr-quick-facts-and-faqs). The resulting score is 38.06 if no cap is used for SPR over the 90 days IEA standard. The score would be 25 if the SPR is capped at 90 days as 100%. 31.5 is the average of these two scores. Japan has the same score whether the SPR is capped at 100% or not as it has 85 days of import equivalent of state administered SPR in 2013. China also has the same score with or without the cap.

[138] Adding the United States to the nine economies already in this plausibility probe to run the same averaging and standardising procedures, the United States receives the designation of" medium" while Japan's designation remains unchanged as medium.

The choice thus narrows down to Indonesia, South Korea and Taiwan. Like Japan, South Korea only has a medium, not high DV in 2013 among the nine case-study economies, but its DV score with the same weighting method is considerably higher at 38.39. If the same extended yardstick of the United States is used to run a 10-economy average, however, South Korea's DV remains only at a medium level.[139] Besides, South Korea has three other apparently incongruent variables versus Taiwan's two, and the levels of the two common incongruent variables are the same for both economies. Since the whole *raison d'être* of this static layer is to investigate the causes that drive states to implement a high level of strategic oil supply measures, Taiwan is a better choice. Then what about the other high-DV economy, Indonesia? Like South Korea, none of its four explanatory variables match the levels stipulated by H3 and two of them, the ones with darker shading, had a two-, instead of one-level difference from the perfect fit of H3.

Taiwan's DV level remains high after the United States is added to the averaging and standardising process. The lightly shaded cells in Table 3.22 indicate the apparently incongruent variables that may become congruent on a more global scale. Alternatively, these are truly incongruent variables that would lead to the refinement of the causal pathway leading to the adoption of a high level of strategic oil supply measures. In any event, Taiwan is examined in-depth in Chapter Five as a deviant case since it does not conform to all the stipulations of H3. Its investigation would point to better explanations of Y, the adoption of a high level of strategic oil supply measures.

The validity of H3 cannot be determined at this point since none of the nine cases with 2013 data match the parameters of it. Taiwan is selected to further examine its validity as a deviant case in Chapter Five.

5.2.2 Validity and Case Selection of H4

China is selected as the best case to further assess the validity of H4 as a non-three-high case. It is the only perfect fit for all the criteria of H4 among the nine case-study economies with 2013 data. Indonesia is close, but it only had a low capability. It is unlikely to be deemed as having a high capability by any other standards. Further, none of the other states in this preliminary study with a medium level of DV is pushed up to become one with high DV when the United States is added to the analysis.[140]

The rest of this section shows that by applying techniques recommended by leading qualitative methodologists, the result on H4 obtained by this preliminary study has a high level of substantive significance. The preliminary validity of H4 may be illustrated by using two-by-two tables, a common method used by qualitative scholars to demonstrate the

[139] Ibid.
[140] See footnotes 137 and 138 above.

validity of the necessary or sufficient causes they propose.[141] H4 is conceptualised as an INUS cause to a high level of strategic oil supply measures (DV) adopted, which is a form of sufficient cause.[142] Each explanatory factor at its stipulated level is a necessary condition making up that particular pathway or INUS cause. Therefore, two-by-two tables for sufficient causes are suitable to examine the plausibility of H4.

A blank two-by-two table for a sufficient cause looks like Table 3.23 below:[143]

		X = 0	X = 1
Y	1	N_1	N_2
	0	N_3	N_4

Table 3.23 Two-by-two Table for Sufficient Cause

In Table 3.23, X is the sufficient cause being investigated. In this study, they are INUS causes. In this illustration, it entails the stipulated levels of the four explanatory factors in H4. Y is the outcome or DV studied, which is a high level of strategic oil supply measures adopted for H4. Zero means the absence of that outcome or cause and 1 the presence of it. The (X, -Y) cell at the bottom right hand corner of a sufficient cause table must have zero case for the sufficient cause to be established.[144]

Table 3.24 below shows the sufficient cause table for H4 by using the levels of the variables show on Table 3.18:

		X (H4 INUS)	
		Not having H4 configuration	Having H4 configuration
Y	High DV	2 (Indonesia, Taiwan)	1 (China)
	Not High DV	6 (India, Japan, Philippines, Singapore, South Korea, Thailand)	0

Table 3.24 2 x 2 Table of H4 as Sufficient (INUS) Cause for Adopting High Level of Strategic Oil Supply Measures

A specific aspect to note about Table 3.24 above is that it has zero case in its (X, -Y) cell at the bottom right. This means that with the data in this chapter, the INUS cause of H4 proposed by the vulnerability-interaction model that would lead to the adoption of a high level of strategic oil supply measures is successfully established. Goertz and Mahoney point out that data on two-by-two tables may be "translated" into χ^2 or correctional

[141] For a good discussion and demonstration of the use of two-by-two tables in qualitative studies, see Goertz and Mahoney, *A Tale of Two Cultures*, 21-23.
[142] It is not possible to use two-by-two tables to evaluate the validity of H1 and H2 because of their relative logic and a relatively low degree of specificity.
[143] Goertz and Mahoney, A Tale of Two Cultures, 21.
[144] This cell is named the "sufficient condition cell." Ibid., 22.

statistics, although somewhat unnaturally. More importantly, the odds ratio of logit analysis can be used to calculate the likelihood of the proposed sufficient cause being frivolous.[145] The odds ratio of the H4 INUS as presented in Table 3.24 is 0.13.[146] This is a highly significant result as it is much smaller than '1,' which indicates the odds of the outcome occurring are the same with or without the exposure to the proposed cause.[147] Two-by-two tables ultimately, however, more strikingly illustrate the relationship of sufficiency in set logic, which underpins this project, not statistics.[148]

Chapter Four will present more explicit data related to the explanatory variables and strategic oil supply measures adopted by China in years leading to 2013 as part of the in-depth investigation of the validity of H2 in the paired comparison of India and China. Many other aspects of China's policies and measures related to state intervention in its oil sectors have also been extensively examined in related studies as discussed in the literature review of this thesis. The analysis in this sub-section shows that the case of China in 2013 unequivocally confirms the reasoning behind the INUS cause of H4 to the adoption of a high level of strategic oil supply measures. Due to the need to limit the parameters of this study's scope, therefore, this project will not further investigate the case of China to verify the validity of H4.

How does the overall validity of the vulnerability-interaction model summarised in this section fare compared to alternative theories? The concluding section below weighs this question as well as summarising initial insights gleaned from the plausibility probe developed here.

6. Conclusion

The plausibility probe presented in this chapter shows that the vulnerability-interaction model stands up well compared to the only applicable alternative approach at this stage – the conventional Realist/geopolitical explanation of why (net oil importing) countries intervene in their economies' oil sectors.

The structural Realist or geopolitical perspective attributes a high level of state intervention in the oil sector to a high implementation capability of the states and the strategic importance of oil to the security and material development of the country. According to this logic, only countries with high implementation capabilities would be able

[145] Ibid., 23.
[146] Results obtained by using the odds ratio calculator on the "MedCalc" website, accessed 22 February 2016, https://www.medcalc.org/calc/odds_ratio.php. Admittedly, the INUS does not have a high significance level with the p value at 0.25. This, however, should be expected with only nine cases, but the odds ratio suggests a substantive significance of the hypothesised pathway to the adoption of a high level of strategic oil supply measures.
[147] Goertz and Mahoney, 23.
[148] Goertz and Mahoney, ibid.

to adopt a high level of strategic oil supply measures. Table 3.18 shows that only one of the three high DV economies, China, had a high implementation capability in 2013.

The vulnerability-interaction model also hypothesised a high implementation capability as an *a prior* condition for the adoption of a high level of strategic oil supply measures. In this regard, the proposed model as it is currently formulated fares no better than the conventional Realist perspective in explaining the two cases of high DV economies without a high capability. The vulnerability-interaction model, however, does specify three other major necessary conditions that are needed for the outcome of the adoption of a high level of strategic oil supply measures in each of the proposed causal pathways. Chinese conditions in 2013 match one of them, H4. Since the Realist perspective puts great importance in the strategic value of oil, one would expect a country with a high OV and high capability would be the top candidate to adopt a high level of strategic oil supply measures according to this perspective. China, however, in fact only had a low OV in 2013. In this regard, the vulnerability-interaction model has more precise predictability than the Realist approach.

If we extend the conventional Realist logic further, countries are expected to adopt a level of strategic oil supply measures either comparable to their capability levels, their OV levels, or both, which appears to be closest to this perspective's reasoning. If we apply the "capability yardstick" alone, according to the results shown on Table 3.18, five of the nine case studies have matching capability and DV levels: China, India, the Philippines, South Korea, and Thailand. This translates into a congruence rate of 56%. If we just apply the "OV yardstick," only one of the nine case studies, South Korea, has matching OV and DV levels. If we apply both yardsticks together, four of the nine case studies, Indonesia, Japan, South Korea, and Taiwan, have matching OV and capability levels, but only one of the four, South Korea has the same DV level as those two explanatory variables – medium. The cases where these two explanatory factors are of different levels, the Realist theory is not specified enough to predict what the DV level would be. The overall cross-case congruence rate of H1 and H2 is 67% and that of H2 alone is 60% and so the vulnerability-interaction model has a better overall predictive power than the Realist approach in cross-case comparisons.

Still, the Realist perspective, if formulated as predicting the level of strategic oil supply measures adopted by states to be the same as both their economies' capability and OV levels, appears to better explain the case of South Korea in 2013. The conventional Realist perspective, however, cannot explain the vulnerability-interaction model deviant cases of Taiwan or Indonesia.

How well does this Realist perspective explain changes in the within-case comparisons? If only the capability yardstick is used, it correctly explains three of the nine cases, meaning directions of these cases' capability level change match those of their DV

level change (or lack thereof). Therefore, it has a congruence rate of 33%. China, Japan, and Singapore's capability and DV levels remain the same over the decade. If the combined capability and OV yardstick are used, only the two no-change cases of Japan and Singapore are consistent with the prediction of the Realist perspective. Overall, therefore, the conventional Realist perspective does not have a greater validity than the cross-temporal dimension of the vulnerability-interaction model. Even the strict interpretation of this dimension of H1 has a 50% congruence rate, while the congruence rate of H2 in this dimension can be interpreted as either zero or 50%.

Of course, the validity of the vulnerability-interaction model must be further verified with more fine-grained data in Chapter Four and its propositions refined or overhauled regarding H3 in Chapter Five before meaningful insights to the two research questions may be offered. Two observations do begin to emerge from this plausibility probe. First, the fluctuations in oil prices in the international oil markets over time do not contribute to changes in economies' OV as much as changes to their oil self-sufficiency rates. China's oil self-sufficiency rate, for example, dropped about 21% while India's dropped slightly over 8% in the decade studied. In the same period, China's per capita income grew faster than India's, which should make the increase in oil prices in the decade more affordable to China.[149] Instead, as shown on Table 3.22, China's OV grew more than 10 times that of India's. In economies as big as China and India's, which consume large absolute amounts of the total oil consumed in the world, the effect of any change in their oil self-sufficiency rates is magnified by the effort needed to secure that amount in the market, which acts as a feedback loop. The same logic should apply both in a tight oil market and an oil glut situation, and to other major net oil consumers, such as the United States. This logic would, therefore, have repercussions to the global effects of the shale oil revolution in the United States, which will be further discussed in the concluding chapter.

The disproportionally large effect of changes in oil-sufficiency rates or conversely the relatively small impact of fluctuations in oil prices on net oil importing economies' OV is also observed in the case of Indonesia. Its oil self-sufficiency rate dropped from over 99% in 2003 to less than 58% in 2013 (an about 42% drop). As shown on Table 3.22, its OV, however, increased over 75% despite a 47% increase in per capita GDP in the same period. This skyrocketing increase in the country's OV within a relatively short period may explain the outlier results of Indonesia as illustrated in Table 3.18. Indonesia has a high DV, yet a low OV and a low implementation capability among Asian net oil importing economies in 2013. It is likely that decision-makers and the public there alike were still adjusting to the

[149] China's grew about 3.1% versus India's about 2.2%. Source of calculation is from the World Bank.

country's identity switch from a century-long net oil exporter to a net oil importing state a decade earlier. Indonesia's 2015 request to reactivate its OPEC membership after a seven-year suspension appears to support this proposition.[150] Its economic nationalism over its still large, but fast dwindling, indigenous oil resources as of 2013 acted as a barrier to the country's oil sector liberalisation.[151] The resulting unusually high DV level compared to both the expectation of the vulnerability-interaction model and among Asian net oil importing economies is at least partially attributed to these unique circumstances.[152] The Indonesian case, therefore, is truly an outlier and has confounding variables that are not applicable to most other net oil importing economies.

Second, as alluded to earlier, it appears that the effect on the DV level of a higher implementation capability would not be "triggered" without a simultaneous drop in the economy's overall trust in the oil markets. The cross-temporal cases of India and Thailand seem to attest to this. This is only a tentative observation since as discussed in Section 4.2, the levels or at least values of other explanatory variables change at the same time in these cases. Still, if this is confirmed to be true in further research, it is actually concordant with the reasoning of the vulnerability-interaction model, which sees trust in the oil markets as the central intervening variable in which the levels of other explanatory variables have to filter through before policy actions would be taken. This observation may also provide refinement to the vulnerability-interaction model, especially the hypothesised pathways to the adoption of a high level of high level of strategic oil supply measures.

[150] Its OPEC membership was reinstated as of 1 January 2016. See Huileng Tan, "Could Indonesia's Entry Complicate an OPEC Production Cut?" CNBC website, 3 December 2015, accessed 20 March 2016, http://www.cnbc.com/2015/12/03/could-indonesias-entry-complicate-an-opec-production-cut.html. Also see "Indonesia facts and figures," OPEC website, accessed 20 March 2016, http://www.opec.org/opec_web/en/about_us/3194.htm.

[151] Former OPEC Secretary-General Roberto Suburoto of Indonesia was quoted saying in 1994: "Although several decades have passed since the era of nationalization [of oil resources in producing countries], our national oil companies continue to possess a rather unique political status in the eyes of their respective nations. They are still regarded as the symbol of national sovereignty that controls the most important and the most valuable resource endowment in our countries." See Marcel and Mitchell, *Oil Titans*, 2.

[152] It has the highest DV score, 63.06, among the nine case-study economies. See Table 3.4.

Chapter Four
Explaining Cross-Case Variations in State Intervention

1. Introduction

This chapter offers two pairwise comparisons to further examine the cross-case validity of the vulnerability-interaction model. The cross-case dimension of the proposed model explains variations in the levels of strategic oil supply measured adopted by net oil importing states at any given time. Two hypotheses - H1 and H2 – are generated here to explain the phenomena. The years immediately preceding 2013 are reviewed because they represent the end of roughly a decade of rising oil prices.

The pairwise comparison between India and Thailand investigates if the trichotomous levels of the two economies' four hypothesised explanatory variables as well as their dependent variable (DV) remained the same. If these conditions hold up under closer scrutiny with more data presented in this chapter, the similar levels of strategic oil supply measures India and Thailand adopted around 2013 can be explained by the similar levels of their oil vulnerability (OV), trust in the oil markets, private capital strength, and implementation capability. This is the essence of H1.

The pairwise comparison between China and India determines if China's implementation capability and DV levels were indeed considerably higher than India's while the levels of their other three explanatory variables were similar. If these conditions do indeed emerge in this comparison, it would suggest that the higher level of strategic oil supply measures adopted by China around 2013 could be explained by its higher implementation capability. This would match the expectation of H2 and bolster the validity of that hypothesis.

As was in Chapter Three, structured, focused comparison is again used to conduct these cross-case comparisons. The more in-depth investigation in this chapter provides better qualitative assessment of complex concepts as a robustness check of the vulnerability-interaction model to the more quantitative assessment in the previous chapter. Content analysis of the annual reports of pertinent NOCs is also conducted to ascertain if there is any evidence of NOCs acting as securitising or powerful lobbying agents of oil supply security to the economies in questions. Using more "open-ended" qualitative data to supplement the more close-ended quantitative data used in the plausibility probe increases the credibility of the results.[1]

[1] For a discussion of the use of closed-ended and open-ended data in research, see John W. Creswell and Vicki L. Plano Clark, *Designing and conducting mixed methods research* (Thousand Oaks, CA: Sage Publications, 2007), 6-7.

This chapter starts with a synopsis of the history of the politics of the oil industries in India and Thailand and a comparison of India and Thailand to examine the cross-case validity of H1. This structure is repeated in the second half of the chapter with the cases of China and India of the same period to examine the cross-case validity of H2. The concluding section summarises the results of these comparisons.

2. Politics of Oil in India and Thailand

India's oil industry has shifted from being dominated by international oil companies (IOCs) in the first decade after its independence to being mostly government-owned and operated by the late 1960s, to gradual liberalisation since the late 1980s.[2] This meandering history of the politics of oil has been entwined with India's larger post-colonial economic developmental experience and evolving ideological orientation and strategic alignment. During the period studied, efforts to liberalise the domestic oil product pricing structure and to divest national oil companies (NOCs) to increase efficiency were countered by bureaucratic red tape and inertia, the impulse of state control over indigenous natural resources, and fear of backlash against oil product price hikes, aided by the rhetoric of securitization.

Thailand's oil industry had also been dominated by IOCs until the last two decades of the 20th century when the Petroleum Authority of Thailand (PTT) was established as a response to the oil price shock in December 1978.[3] The PTT and its exploration and production (E&P) subsidiary were transformed into public limited companies and have remained majority-owned by the state. The overall government control of oil supply to the Thai economy, as demonstrated in Chapter Three, was very similar to that in India as of 2013.[4] Both the laws governing the E&P of indigenous petroleum resources and the oil product pricing structure were more market-conforming in Thailand during the period studied, but far from being unfettered.[5] This provided more room for the continued operation of IOCs in Thailand.

Yet, further divestment of the Thai NOC and lowering of state intervention in the Thai oil sector appear to be hindered by similar factors and rhetoric as in India, even if the specifics and many other circumstances in the two countries were different. The relatively

[2] "Burmah Shell, Standard Vaccum and Caltex (now merged into Shell, Exxon, and Chevron respectively)" dominated India's oil market at the time of independence in 1947. See Ashok Desai, Laveesh Bhandari, Ramrao Mundhe, and Bhupindra Yadav, *Public Enterprises, Government Policy and Impact on Competition – Indian Petroleum Industry*, (New Delhi: Indicus Analytics, January 2009), 9.
[3] "Background," PTT website. Accessed January 12, 2018, http://www.pttplc.com/en/about/pages/background.aspx.
[4] See Table 3.1 in Chapter 3. One possible explanation of this is the relative efficiency of the PTT.
[5] See Section 2.1 in this Chapter for more details, especially footnotes 29-39.

low oil vulnerability (OV) of these two countries among Asian net oil importing economies does not result in a low level of strategic oil supply measures in either. The relatively low strength of private capital and trust in oil markets hampered oil sector liberalisation while moderate state capability put a check on any desire to augment these measures, resulting in an overall medium level of intervention in both. H1 of the vulnerability-interaction model states that if the four major proposed factors modulating intervention in two economies are at similar levels at any given time, the overall levels of state intervention in oil supply to their economies would also be similar. The in-depth pairwise comparison in the next few sub-sections confirms this sums up the situations of India and Thailand as of 2013.

Comparison of India and Thailand in 2013: The variable levels of India and Thailand with 2013 data match the parameters and outcome stipulated in H1 in the preliminary study. This means that all the trichotomous levels of key explanatory factors and the levels of the strategic oil supply measures they adopted were the same. This is summarised below:

Strategic Oil Supply Measures Adopted (DV Level)	OV (IV) Level	Strength of Private Capital Vs. State	Overall Trust in Oil Markets	Overall Implementation Capability
Medium	Low	Low	Low	Medium

Table 4.1 Trichotomous Levels of All Variables for India and Thailand in 2013 in preliminary study

The levels of each of these variables in the two economies are reassessed with more precise data in this chapter, which also serves as a rationale for structured, focus comparison applied in this study. The results show that India and Thailand adopted an even more similar level of strategic oil supply measures in the years leading up to 2013. They also had a remarkably similar OV level. The overall strength of private capital in Thailand, however, appears to be stronger than that is suggested in the preliminary study, but not to the point of moving up one trichotomous level. The small difference in their overall trust in oil markets holds, and their overall capabilities to implement strategic oil supply measures also remain very similar. The cases of India and Thailand in 2013 reaffirm the validity of the cross-case dimension of H1, as formulated in Chapter 2. The similarity of their DV levels can be explained by the similarity of the levels of the four nominated explanatory variables.

2.1 Strategic Oil Supply Measures Adopted by India and Thailand

Two more strategic oil supply measures are taken into account in this chapter in addition to the two that make up the strategic oil supply indicator in Chapter Three. The first one is international oil supply investments engaged in (or not) by Indian and Thai NOCs in

2013.[6] The second one is how much relative preference was given to NOCs in the E&P of indigenous oil resources.[7] Overall, the levels of strategic oil supply measures adopted by India and Thailand in and around 2013 remain very similar after factoring in these two additional measures.

2.1.1 India and Thailand's International Oil Supply Investments

The government of India continued to encourage its NOCs to "pursue equity oil and gas opportunities overseas"[8] as a way of ensuring oil supply security in 2013 as it had since the 1990s.[9] Up to 2013, India's central public sector enterprises in the petroleum sectors or NOCs "acquired E&P assets in more than 20 countries"[10] with the total investment "in excess of US$21 billion."[11] The most prominent of these enterprises was Oil & Natural Gas Corporation Videsh Limited (OVL). It is a wholly-owned subsidiary of Oil & Natural Gas Corporation Limited (ONGC), the largest upstream oil and gas company in India.[12] OVL produced "about 8.357 MMT [million metric tons] of oil and equivalent gas during the year 2013-14 from its assets abroad in Sudan Vietnam, Venezuela, Russia, Syria, Brazil, South Sudan and Colombia."[13] Expanding into overseas oil E&P projects is also a stated objective of India's other major NOC, the Indian Oil Corporation Ltd., (IOCL) in 2013.[14] It had 11 overseas E&P blocks[15] in seven countries: the USA, Libya, Gabon, Nigeria, Yemen, Canada, and Venezuela.[16] Not all of these were producing oil, but its share of a

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[6] Since both economies have prominent NOCs, comparing the extent of these investments is reasonable. Apart from the difficulty of quantifying this particular measure, it is not incorporated in the strategic oil supply indicator in the preliminary study because that would risk pushing the scores of economies that have NOCs unduly high. This is because the measure of government control of crude oil supply already factors in the dominance of NOCs. In addition, some of the economies do not have NOCs, which means they would not have any overseas equity oil E&P projects by NOCs.

[7] Again, this is a reasonable measure to compare between India and Thailand, but not among all nine preliminary study economies. Only four of these nine, among them India and Thailand, are known to have dwindling but still worth-producing indigenous oil resources and upstream NOCs.

[8] *Government of India – Ministry of Petroleum and Natural Gas Annual Report 2012 – 2013*, 7. Regardless of the motivation(s) behind this policy statement, the state is clear that is a measure to be encouraged.

[9] Shebonti Ray Dadwal and Uttam Kumar Sinha, "Equity Oil and India's Energy Security," S*trategic Analysis*, Vol. 29-3 (Jul-Sep 2005), 521. As discussed in Dadwal and Sinha and other studies, this is not to say the Government of India supports each and every proposed overseas equity oil project of its NOCs. I also acknowledge that the Indian government, and especially the NOCs, has goals other than ensuring oil supply security in supporting or implementing such projects. The assumption of the vulnerability-interaction model is still valid as long as securing oil supply is a major goal. For more discussions on this, see the OV (IV) section latter in this chapter.

[10] *Government of India – Ministry of Petroleum and Natural Gas Annual Report 2012 – 2013*, 7.

[11] Ibid., 6.

[12] Tanvi Madan, "India's ONGC: Balancing Different Roles, Different Goals," *The Changing Role of National Oil Companies in International Energy Markets* (Houston, TX: The Baker Institute, Rice University, 2007), 1.

[13] *Government of India – Ministry of Petroleum and Natural Gas Annual Report 2012 – 2013*, 7.

[14] *IndianOil Annual Report 2013-14*, 19.

[15] Ibid., 64.

[16] Ibid., 9.

project in the USA provided a gross production of about 160,000 barrels of oil.[17] The smallest of the NOC involving in upstream oil E&P - Oil India Limited (OIL) - was also involved in 14 overseas blocks in eight countries as of 2013.[18]

Developing international oil supply related projects, including oil E&P, was clearly the intention of both the Thai government and the PTT, the Thai NOC, in 2013. The Department of Mineral Fuels under the Ministry of Energy argues that "accelerated exploration and development not only of Thailand's concession area but also of the Malaysia-Thailand Joint Development Area" would be one way to secure energy supply.[19] Regarding its upstream business, PTT indicates its "mission is to seek and secure competitively priced crude oil and natural gas to ensure Thailand's energy security" by operating domestic and international petroleum E&P and investing in "associated businesses."[20] PTTEP, the upstream subsidiary of PTT and its partners, operated 42 projects in 10 countries in 2013, including Myanmar, Algeria, Kenya, and Australia.[21] While many of these projects had not reached the production phase or did not produce crude oil, the average output of PTTEP's 16-1 project in Vietnam in 2013 included 43,700 barrels per day (b/d) of crude. The PTTEP Australasia's Montara project in the Timor Sea began producing 10,000 b/d starting June 2013.[22]

No information has been found by this author on the investment amount PTT and its subsidiaries have made in overseas oil and gas E&P. PTT's oil production from such projects is likely somewhat higher than the two projects listed in the last paragraph, but probably would not be thousands of times higher as would be required to match India's figures.[23] In view of the long lead time from formulation to actual implementation of many strategic oil supply measures, however, it is contended here that it is reasonable to also include an international oil supply project actualised not too long after 2013. In June 2015, PTT signed an oil-for-loans agreement with Ecuador's NOC, Petroecuador, to supply it with 116.6 million barrels of oil for "an up-front payment of 2.5 billion."[24] No known comparable

[17] The "participating interest" of IOCL in the Niobrara shale asset in the U.S. provided the "first ever revenue earnings from its E&P business." Ibid., 64.
[18] *Oil India Limited Annual Report 2012-13*, 28. OIL was a joint venture partner in all these projects. IOCL was also partners to 12 of the 14 projects. Ibid., 29-30.
[19] [Thai] *Department of Mineral Fuels under the Ministry of Energy Annual Report 2013*, 6.
[20] *PTT Public Company Limited Annual Report 2013*, 45.
[21] Ibid., 68 - 69.
[22] Ibid., 70.
[23] 53,000 b/d equal to a little over 1,078 metric tons a year. Even if only half of OVL's overseas production in 2013 is actually crude oil, it would be almost 3,000 times higher than 1,078 metric tons. For the barrels oil per day to metric ton per year conversion rate, see *BP Statistical Review of World Energy June 2014*, 44.
[24] "Ecuador negotiated Thailand crude sales on favourable terms: Correa," Reuters 5 August 2015, accessed 10 July 2016, http://www.reuters.com/article/ecuador-thailand-idUSL1N10G17N20150805.

deal with oil-producing states or their NOCs are known to be carried out by Indian NOCs during the same period.[25] If the oil acquired through Thai-Ecuador deal is included, the amount of overseas oil acquired by the PTT and its subsidiaries would still be lower, but much closer to the amount acquired by Indian NOCs.[26] After including this deal, the amount of oil either directly developed by NOCs or obtained through oil-for-loan programs overseas by India and Thailand was proportionally similar to their respective economies' total oil consumption around 2013.[27]

2.1.2 Preference to NOCs for Indigenous Oil Development in India and Thailand

The second additional strategic oil supply measure taken into consideration in this paired comparison is the preference given to NOCs in developing indigenous oil resources. This measure is apt to be compared between India and Thailand at this stage since they, together with China and Indonesia, are the only four economies in this study's preliminary survey of data that are known to still have substantial levels of indigenous oil resources. In addition, India and Thailand's oil self-sufficiency rates as of 2013 were relatively similar.[28]

Domestic oil E&P in India has been governed by the new exploration licensing policy (NELP) since 1999.[29] NELP effectively ended five decades of state monopoly in oil E&P activities as both private and public entities and even 100% foreign-owned companies are now allowed to engage in open bidding for the right to explore and develop oil in India.

PTT EP also signed oil and gas E&P agreements with companies in Brazil and Myanmar in 2014, but it appears that oil has not been produced from these projects yet. For details of these agreements, see Henry K.H. Wang, *Energy Markets in Emerging Economies – Strategies for Growth* (Oxford: Taylor & Francis, 2016), 198-199.

[25] OIL did provide a $35 million loan to the private Dublin-headquartered oil firm PetroNeft to finance its project in Siberia in early 2016. However, it is asserted in this study that both the recipient of the loan and the timing (and scale) of the funding (for an exploration and development project in 2016 and 2017) make this incident not comparable to the Thai-Ecuador deal. For a report on the loan, see Charlie Taylor, "PetroNeft says first tranche of Oil India loan executed," *The Irish Times*, 23 March 2016, accessed 1 August 2016, http://www.irishtimes.com/business/energy-and-resources/petroneft-says-first-tranche-of-oil-india-loan-executed-1.2584165.

[26] The term of this deal appears to stretch for five years (ibid.), which makes the yearly amount of oil supplied slightly less than 3.2 MMT per year (using the conversion rate in the *BP Statistical Review* referenced in footnote 23).

[27] If we use the 8.357 MMT produced by OVL as the base and round it up to 9 MMT as the total overseas equity oil produced by Indian NOCs in 2013, it would equal to about 5.1% of India's total oil consumption that year. If we use 3.2 MMT (the yearly supply from the Thai-Ecuador oil-for-loans deal) as the base and round it up to 3.3 MMT, Thailand total overseas equity oil "produced" around 2013 would be about 6.5% of the economy's total consumption (calculated with 2013's consumption figure).

[28] Using the data in the *BP Statistical Review of World Energy June 2014* to do the calculation, India's was 23.94% and Thailand's was 33.78%.

[29] Muhammad Azhar, "New Exploration licensing policy (NELP) in India," *OPEC Energy Review* 35 (2011), 174.

[30] While the policy's role in achieving the goal of accelerating and more efficiently developing India's hydrocarbon resources is open to debate,[31] at least on a legal basis, no preference was given to NOCs in the bidding process, especially after the sixth round of NELP bidding in 2006.[32]

Since 2007, the E&P of domestic hydrocarbon resources in Thailand has been governed by the Petroleum Act and the Petroleum Income Tax Act No. 6 under what is called the Thailand III terms.[33] Under these new procedures, qualified foreign as well as Thai limited companies may be awarded indigenous oil E&P concessions. All applications were also partially graded by the provision of "scholarships, training, contributions to support petroleum development in Thailand…"[34] The seemingly more restrictive new rules announced in relation to the latest concession rights bidding round in October 2014 were met with legal challenges. This led to the cancellation of the bidding in 2015.[35] Besides, the changes were made beyond the temporal scope of this study and so are not considered here.

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[30] Ibid, 176. Also see *Hydrocarbon Exploration and Production Activities, India 2012-13* (Directorate General of Hydrocarbons Under Ministry of Petroleum & Natural Gas, Govt. of India), 6.

[31] According to Azhar, the policy led to "substantial discovery of oil and gas" and a "domestic duopoly" of ONGC, a NOC, and Reliance Industries Limited, a private firm. Ibid, 183-185. On the other hand, Carl, Rai, and Victor describe the performance of the NELP as "lackluster." See Jeremy Carl, Varun Rai and David G. Victor, "Energy and India's Foreign Policy," Program on Energy and Sustainable Development Working Paper #75 (Palo Alto, CA: Stanford University, 2008), accessed 1 August 2016, http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1400184.

[32] According to Azhar's study quoted above, the indigenous hydrocarbon E&P evaluation system before the sixth round of bidding under the NELP in 2006 was unduly, if unintentionally, favoring NOCs due to the weightings of the selection criteria. But the weighting and the system itself have been drastically changed since the sixth round and apparently the playing field has been leveled for both state and private bidders. In addition, after the ninth round of NELP bids were awarded in 2011, the Indian government has been moving towards a new system labeled the Open Acreage Licensing Policy that is more efficient and transparent. See Azhar, 181-183. For details on the evolution of the terms and conditions of the NELP rounds and their chronology, see *Hydrocarbon Exploration and Production Activities, India 2012-13*, 63.

[33] Ratana Poonsombudlert *et al*, "Thailand Petroleum Concessions," Chandler & Thong-ek Law Offices Ltd., Bangkok, 14 December 2015, 2. Accessed 5 January 2016, http://www2.ctlo.com/mediacenter/whatsnew/2015-12-16-ThailandPetroleumConcessions-13(14Dec.2015)_(1791069_1).pdf.

[34] Ibid., 5.

[35] The rule that is more pertinent to this discussion stipulates that "[a]fter discovery, a right by a Thai company (owned more than 50% by Thai nationals) approved by the Petroleum Committee, to farm in for not less than 5% undivided participating interest…" Ibid., 6. In June 2016, amended laws that enable the change of rules were passed by the Thai legislature, which will change the existing concession system to the more widely practiced profit sharing agreement system (as in India) and also the service contract system (as in the Philippines). See Aekarach Sattaburuth, "Petroleum bills pass amid opposition," *The Bangkok Post*, 25 June 2016, accessed 10 August 2016, http://www.bangkokpost.com/business/news/1019297/petroleum-bills-pass-amid-opposition. Also see David Beckstead, "Potential Amendments to Thailand's Petroleum Act," *The Bangkok Post*, Corporate Counsellor Column, 22 July 2016, accessed 10 August 2016, http://www.tilleke.com/resources/potential-amendments-thailands-petroleum-act.

On the surface, therefore, the Thai as well as the Indian governments did not assign any preference to their NOCs in bidding for indigenous oil E&P in 2013 or the years immediately before or afterwards. Below the surface, however, the playing fields were not as level as they looked and also not level to the same degree. First, both states reserved the right to keep indigenous resources home regardless if state or private companies developed them. The Indian Ministry of Petroleum and Natural Gas (MPNG) stipulated that until India becomes totally self-sufficient in crude oil, all companies must sell the crude they developed in India in the domestic market, even if this might not be strictly enforced.[36] The Thai Petroleum Act, by contrast, allowed much greater leeway for the export of the crude developed in Thailand. The Thai Minister of Energy was only empowered to "temporarily" prohibit crude export "to ensure an adequate supply of petroleum to meet domestic demand."[37]

Second, although the prices of crude oil were not controlled, the prices of oil products were not allowed to float totally freely in the domestic markets in either economy, which indirectly affected private oil firms' profit calculation. This was especially true in India. As of 2013, the price of kerosene, domestic LPG, and diesel were still subsidised by the Indian government, while the price of petrol was only decontrolled in 2010.[38] Thailand's policies have been more market-conforming in both cases and so should be understood as adopting a slightly lower level of the strategic oil supply measure of providing preference for NOCs in developing indigenous oil resources.[39] To sum up, the levels of strategic oil supply measures adopted by India and Thailand remain very similar after examining both additional measures in this sub-section.

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[36] See Article 18.1, *Model Production Sharing Contract, Ninth Offer of Blocks, MPNG, Government of India 2010*, 46. Companies may apply for export licenses on a case by case basis with special conditions attached.

[37] See Thailand Petroleum Act No. 6, 2007, as translated by and is available on the ThaiLaws.com website, accessed 15 August 2016, http://thailaws.com/law/t_laws/tlaw0430.pdf. In August 2014, the Minister did impose such a ban. See Yuthana Praiwan, "Wassana oil too crude for refining as export ban lifted," Bangkok Post, 13 October 2015, accessed 15 August 2016, http://www.bangkokpost.com/print/727392/.

[38] The subsidies the Indian government paid to NOCs, known as under-recoveries, made it difficult for private firms to market the oil they developed since they are not entitled to such subsidies. The price of diesel was finally decontrolled at the end of 2014, which suggests the playing field is slowly getting more level even in India. See Pravin Kumar Agarwal and Anmol Soni, *Petroleum Product Pricing Reforms in India: Are We on the Right Track?* The Energy and Resources Institute Policy Brief, March 2013; R. Jai Krishna, "Reliance Petrol Stations Are Back in Business in India," *The Wall Street Journal*, 21 May 2015, accessed 15 August 2016, http://www.wsj.com/articles/reliance-petrol-stations-are-back-in-business-in-india-1432210861.

[39] The oil product price subsidy in Thailand takes the form of levying taxes on oil products to fill the oil fund to cushion the impact of high oil price since 1991 (at least that is the original intention of the policy). The pricing of crude oil has largely followed the price of the international oil market. For discussion on the functioning of the oil fund, see Thiraphong Vikitset, *The Role of Oil Fund in Thailand: Past, Present, and Future - Final Report Submitted to the Research Promotion Committee, National Institute of Development Administration, July 2013*.

2.2 Oil Vulnerabilities of India and Thailand

One oil market risk and one supply risk not considered in the plausibility probe are examined in this study to provide a more comprehensive understanding of the overall OV of India and Thailand around 2013. The additional market risk is the oil intensity of their respective economies. In this chapter, "oil intensity" is calculated as to how much gross domestic product (GDP) per ton of oil generates.[40] Using this method of calculation, India's oil intensity in 2013 was 0.027 while Thailand's was 0.050. This means the Thai economy was more than 85% more vulnerable to oil price fluctuations that year if only this measure of comparison is used.[41] Thailand, therefore, would be more vulnerable to oil price fluctuations that year if only this measure of comparison is used. Regardless of the causes of the difference in the oil intensities of these economies, the fact remains that the higher that intensity, the more adversely affected the economy would be by fluctuations in oil prices.

The additional oil supply risk examined here is the concentration of the sources of oil supply to India and Thailand and the overall risks associated with the concentration. A modified Herfindahl-Hirschman Index (HHI), weighted with the comprehensive risk of individual supplying countries, is developed to calculate the overall oil supply risks.[42] Therefore, the economy scoring higher on this index would have a higher concentration of oil suppliers and hence a higher overall oil supply risk.[43] India scored 87.24 while Thailand 68.94 on this index in 2013. Therefore, India has a 26.54% higher oil supply risk by this measure alone.[44]

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[40] This is adapted from the measure of energy intensity of GDP. For a discussion of that and the importance of using a unified currency unit to calculate the index, see Shigeru Suehiro, "Energy Intensity of GDP as an Index of Energy Conservation," August 2007, The Institute of Energy Economics website, accessed 15 August 2016, http://eneken.ieej.or.jp/en/data/pdf/400.pdf.

[41] The source of oil consumed is *BP Statistical Review of World Energy June 2014*, 11. The source of purchasing power parity in 2011 US$ is from the World Bank, accessed 15 August 2016, http://data.worldbank.org/indicator/NY.GDP.MKTP.PP.KD. The results represent tonnes of oil consumed/thousand US$ of GDP.

[42] This indicator is roughly modelled after the one developed by Eshita Gupta in her 2008 study. For a discussion of how she calculates this indicator, see "Oil Vulnerability Index of Oil-Importing Countries," *Energy Policy* 36 (2008): 1198-1200. The political risks in this study are also derived from the comprehensive risk rating in the Country Risk Guide produced by the PRS Group, but instead of regional risks, the risks associated with individual oil supplying countries are used here. This would differentiate high-risk countries such as Iran and Sudan, from OPEC and Africa respectively in general.
The data for crude oil import sources are from the Massachusetts Institute of Technology website, Observatory of Economic Complexity: An Analytical Tool for Understanding the Dynamics of Economic Development. Workshops at the Twenty-Fifth AAAI Conference on Artificial Intelligence (2011), developed by Alexander Simoes and César Hidalgo. Accessed 2 October 2016, http://atlas.media.mit.edu/en/visualize/tree_map/hs92/import/ind/show/2709/2013/

[43] For a quick reference of the calculation and interpretation of the HHI, see Benjamin I. Cohen, "A Method for Analysing the Effect of Competition on Restricting Imports," *Northwestern Journal of International Law & Business* 5-3 (1983): 512-513.

[44] For details of the calculation of these scores, see Tables 10 and 11 in Appendix C.

India and Thailand's. This remarkable similarity continues after two more risk factors are taken into consideration in this sub-section. India's lower oil intensity is to an extent offset by the higher risk associated with its oil supply sources versus those of Thailand.

2.3 Strength of Private Capital in India and Thailand

In this paired comparison the historical-institutional source and the actor specific source that are hypothesised to contribute to the overall strength of private capital versus that of the state are disaggregated. Doing so would provide a clearer picture of the different origins of that overall strength as well as a more targeted understanding of where the domestic-international-state-capital equilibrium lies, specifically in the petroleum sectors. This equilibrium at once contributes to and is impacted by the overall strength of private capital in the entire economy.

The combined scores of the two economic freedom indicators used in the preliminary assessment of this study to gauge the strength of private capital in the economy as a whole are only used to represent the historical-institutional source of it here. No new data are added as these indicators have already taken into consideration a wide array of pertinent institutional factors.[45] India's combined average 2013 score is slightly lower at 60.9 than Thailand's 64.6.

The actor-specific source of India and Thailand's private capital strength in their petroleum sectors is examined in this chapter to have a more complete picture of the where the private-state capital balance lies in their overall economies as of 2013. After this more targeted source is factored in, private capital appeared to be even stronger in Thailand in 2013 than the result of the single-source preliminary study suggests. This greater strength, however, does not amount to an upgrade in Thailand's trichotomous ranking of the overall strength of private capital versus that of the state.

The framework with the four scenarios describing the domestic-international-capital-state balance laid out in Chapter Two is applied in this chapter. The same graphic representation of this framework is reproduced below for easy reference:

[45] The Index of Economic Freedom, for examples, examines the rule of law, government size, regulatory efficiency, and market openness of each economy, with a number of components making up these four major areas of investigation. See "Methodology – 2016 Index of Economic Freedom," The Heritage Foundation website, accessed 20 December 2016, http://www.heritage.org/index/book/methodology. The Economic Freedom of the World index examines the size of government, legal system and property rights, "sound money," such as the "freedom to own foreign currency bank accounts," and freedom to trade internationally of each economy. Again, a number of components make up these four categories. See "Approach – Economic Freedom," the Fraser Institute website, accessed 20 December 2016, https://www.fraserinstitute.org/economic-freedom/approach.

		International Capital	
		Stronger	Weaker
SOEs	Stronger	Negative **Scenario 1**	May be positive due to state "capture" **Scenario 2**
	Weaker	Negative but empirically improbable **Scenario 4**	Negative due to effect of int'l capital. Effect of domestic capital counts as neutral **Scenario 3**

Figure 4.2 Actor-specific component correlation with DV, depicted as domestic capital's relationship vis-à-vis strength of international capital and SOEs

2.3.1 International-Domestic-Capital-SOE Balance in Indian Petroleum Sectors

The Indian petroleum sector as a whole was dominated by IOCs in the first decade or so after independence, but by the 1970s, the situation was almost completely reversed.[46] The low efficiency of NOCs and other exogenous factors led to gradual liberalisation of the sector beginning in the 1980s, which cumulated to the adoption of the NELP in the upstream sector in 1999.[47] Since then, private firm - even 100% foreign-owned oil firms - have been allowed to bid for indigenous oil E&P projects. In fact, the petroleum sector has been placing somewhere between the 9th and the 11th largest foreign-investment-receiving sector in India in recent years.[48] This only translates into a little less than 3% of the total FDI inflow, but was already higher than that for the Indian economy as a whole. The five-year average of the overall inbound FDI between 2009 and 2013 accounted for 1.8% of India's GDP of the same period. [49] For example, Cairn UK Holding, via its subsidiary Cairn India, made the second largest greenfield foreign investment project in value in India during the period

[46] For the history of this reversal of fortune, see Biplab Dasgupta, *The Oil Industry in India* (London: Frank Cass & Company Ltd., 1971) and V. Vedavalli, *Private foreign investment and economic development – A case study of petroleum in India* (Cambridge: Cambridge University Press, 1976).
[47] Ashok Desai, Laveesh Bhandari, Ramrao Mundhe, and Bhupindra Yadav, *Public Enterprises, Government Policy and Impact on Competition – Indian Petroleum Industry*, (New Delhi: Indicus Analytics, January 2009), 12-14.
[48] The petroleum sector ranks the 9th for total accumulative FDI up to December 2010 and the 11th up to December 2013. See "Fact Sheet on Foreign Direct Investment From August 1991 to December 2010," (p2) and "Fact Sheet on Foreign Direct Investment From April 2000 to January 2013," (p 8), Department of Industrial Policy & Promotion, Government of India, accessed 5 September 2016, http://dipp.nic.in/English/Publications/FDI_Statistics/FDI_Statistics.aspx.
The data available does not specify whether it is referring to the upstream, midstream, or downstream petroleum sector, but in the case of India at least, judging by the existing configuration of the petroleum sector as a whole, international capital mostly only invests in the upstream sector.
[49] The source for the calculation is "Foreign direct investment, net inflows (% GDP)," World Development Indicators, The World Bank, accessed 5 September 2016, http://data.worldbank.org/indicator/BX.KLT.DINV.WD.GD.ZS.

between June 2006 and September 2009.[50] Yet, major international oil companies such as Exxon, Shell, and Chevron have never participated in any of the NELP bidding to develop indigenous hydrocarbon resources, and the domestic upstream oil sector is a near duopoly between the major NOC ONGC and the domestic private firm Reliance.[51]

Private oil firms, including international ones, have been present in the India's mid- and downstream oil sectors, but their manoeuvring room in the domestic market was limited by the less than totally freely floating product prices in the decade leading to 2013. These firms, such as Reliance, Essar Oil, and Shell chose to "focus on either the lucrative export market or remain inactive in the absence of a level playing field."[52] Reliance, for example, was granted a 100% export-oriented unit status by the Indian government in 2007 to export the crude it developed in India provided that it "balanced its total imports and exports."[53]

In the petroleum sectors, domestic private capital was stronger than international capital in India's domestic markets. Domestic oil firms, regardless of the source of their capital, however, were still far weaker than multinational corporations. For example, the biggest company by revenue in India according to the "Fortune India" 2013 list, the NOC IOCL, ranked 88th on the Fortune Global 500 2013 list.[54] IOCL made just over 3% of the profits made by the company topping the list, which happened to be also an oil company, Royal Dutch Shell.[55] The second, third, and fourth biggest companies in India that year according to this list were almost all oil firms, but they were smaller in size: Reliance Industries Limited, ranking 107th, Bharat Petroleum (NOC), ranking 229th; and Hindustan petroleum (NOC), ranking 260th.[56] The gaps of the absolute strengths between Indian corporations and international corporations in other sectors appear to be also very great. For example, the largest automobile manufacturer in India, Tata Motors, made less than 9% of the profits of Volkswagen, the world's top-ranking automobile manufacturer in 2013.[57]

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[50] Premila Nazareth Satyan and Pramila Raghavendran, "Inward FDI in India and its policy context," *Columbia FDIProfiles*, March 12, 2010, 10. Accessed 5 September 2016, Columbia University Academic Commons http://hdl.handle.net/10022/AC:P:8788.
[51] Azhar, 184.
[52] K. Ravichandran and Anjan Ghosh, "Industry Outlook: Challenging Times Ahead for the Indian Downstream Oil Sector," *ICRA Rating Features January 2009*: 7.
[53] Desai *et al*, *Public Enterprises, Government Policy and Impact on Competition*, 20.
[54] See "Global 500 2013," Fortune website, accessed 9 September 2016, http://fortune.com/global500/2013/ and "Fortune India 2013" Fortune website, http://fortuneindia.com/500/2013#details_1.
[55] Ibid.
[56] Ibid. According to the measure of market capitalization, however, Reliance was listed as a stronger energy company (ranking 25 in 2013 and 21 in 2012) than ONGC, the only other Indian energy firm on the list (ranking 30 in 2013 and 25 in 2012). See "IHS Energy 50 – The Definitive Annual Ranking of the World's Largest Listed Energy Firms, January 2014."
[57] These are according to the Forbes Global 2000 2013 list, which "uses an equal weighting of sales, profits, assets and market value to rank companies." Accessed 9 September 2016, http://www.economywatch.com/companies/forbes-list.

Domestic private oil firms were definitely still in a weaker position than public enterprises in all sectors of India's oil supply chain as of 2013, more so than in the overall economy. In the upstream sector, up to the eighth round of NELP bidding in 2010, "ONGC held 57 per cent, RIL [Reliance] held 30 per cent and others, more than 50 companies, held just 13 per cent of the total NELP acreage."[58] The slow pace of oil product decontrol and the related complex under-recovery policies render the downstream sector still totally the domain of public enterprises.[59]

To sum up, domestic private capital in the petroleum sectors of India was weaker than international capital in absolute terms and also weaker than NOCs by 2013. This puts the actor-specific source of the India's domestic private capital vis-à-vis those of international and state capital in the third scenario or the bottom right quadrant of Figure 4.2 above.

2.3.2 International-Domestic-Capital-SOE Balance in Thai Petroleum Sectors

Foreign investments have long been a major funding source in Thailand's petroleum sectors, much more so than in the overall Thai economy.[60] In particular, "Chevron is the largest oil producer in Thailand, accounting for nearly 70 per cent of Thailand's crude oil and condensate productions."[61] It is also the majority owner of a major refining facility,[62] and its Caltex brand operates about one-third of service stations in the country.[63] In addition, a variety of other foreign-capital funded oil firms were awarded oil concessions in Thailand in the few years before 2013.[64]

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[58] Azhar, 184.

[59] The subsidies to NOCs, known as under-recoveries, made it difficult for private firms to market the oil they developed since they are not entitled to such subsidies. The price of diesel was finally decontrolled at the end of 2014, which suggests the playing field is slowly getting more level even in India. See Pravin Kumar Agarwal and Anmol Soni, "Petroleum Product Pricing Reforms in India: Are We on the Right Track?" *The Energy and Resources Institute Policy Brief*, March 2013; R. Jai Krishna, "Reliance Petrol Stations Are Back in Business in India," *The Wall Street Journal*, 21 May 2015, accessed 15 August 2016, http://www.wsj.com/articles/reliance-petrol-stations-are-back-in-business-in-india-1432210861; and Saurabh Chaturvedi and Prasanta Sahu, "India Frees Diesel Prices From Government Control," *The Wall Street Journal*, 20 October 2014, accessed 15 August 2016, http://www.wsj.com/articles/india-frees-diesel-prices-from-government-control-1413648469.

[60] The five-year (2009-2013) average inbound FDI in the overall Thai economy is 2.86% of its GDP. This is calculated with the same World Bank data as in India. See footnote 49 above.

[61] Wang, 198.

[62] It owns about 60% of the share. Also note that the rest of the shares are owned by the NOC and its subsidiaries. See "Star Petroleum Refining Public Company Limited," American Chamber of Commerce in Thailand website. Accessed 16 September 2016, http://www.amchamthailand.com/ACCT/asp/corpdetail.asp?CorpID=1606.

[63] Caltex operates about 370 out of the less than 1,200 service stations in Thailand. See "Thailand, highlights of operation," Chevron website. Accessed 17 September 2016, https://www.chevron.com/worldwide/thailand#highlightsofoperations. There were about 1,157 service stations in Thailand as of 2010. See Silvana Tordo *et al*, *National Oil Companies and Value Creation, Volume II* (Washington, D.C.: The World Bank, 2011), 97.

[64] Some examples include: Carnarvon Petroleum Limited (Australian-based) and Shaanxi Yanchang Petroleum (Group) (owned by the Shaanxi provincial government in China). See [Thai] *Department of Mineral Fuels under the Ministry of Energy Annual Report 2013*, 39.

As in India, domestic private corporations in Thailand were certainly weaker than international capital in absolute terms, even if they might be stronger in the domestic market in some sectors, such as banking and agribusiness. No Thai corporation was on the 2013 Global Fortune 500 list. The top ranking Thai corporation on the 2013 Forbes Global 2000 list was the NOC PTT PCL, and the profits it made was 7.57% of those made by the top oil firm on the same list, Exxon Mobil.[65] The second largest Thai corporation on the list was the privately-owned Siam Commercial Bank (SCB).[66] The profits it made were only 3.44% those of the bank topping the same list, the ICBC Bank of China.[67]

In the petroleum sector as a whole, NOCs were definitely stronger than domestic private corporations in Thailand up to 2013. PTT's monopoly in natural gas purchasing, wholesaling, and distributing in the domestic market make its overall position formidable even if it did not enjoy the same monopoly regarding crude oil or oil products.[68] With the existing dominance of IOCs and NOCs in the oil sectors, there has not been much room left for domestic capital to participate in them, except through owning shares of PTT or its subsidiaries and affiliates.

After examining the strength of domestic capital versus that of SOEs in Thailand's overall economy and the oil supply sectors above, the conclusion is that the actor-specific source of Thailand's domestic capital fits in the same bottom right quadrant of Figure 4.2 as in India. Thai domestic private capital was no doubt weaker than international capital in absolute terms. It was also much weaker than state capital as of 2013. This means that in Thailand as well as in India, the effect of the actor-specific source on the overall strength of private capital is neutral. Its effect on the level of strategic oil supply measures adopted, therefore, hinges on the state's orientation.

The vulnerability-interaction model hypothesised that the state's orientation in the oil supply sectors is predicated on the economy's OV and decision-makers' trust in the oil markets. Thailand's slighter higher trust in the oil markets, as further explored in the next section, may have contributed to its relatively more liberalised petroleum sector governance and stronger positions of IOCs in Thailand in the decade leading to 2013. The greater historical-institutional support private capital in Thailand received as suggested by its slightly higher combined average overall economic freedom score would further bolster the

[65] See "Forbes Global 2000: Thailand's Largest Companies," http://www.economywatch.com/companies/forbes-list/thailand.html and "Forbes Global 2000: The World's Largest Companies in 2013,"Economy Watch website. Accessed 15 September 2016, http://www.economywatch.com/companies/forbes-list.
[66] Ibid.
[67] Accessed 15 September 2016, http://www.economywatch.com/companies/forbes-list. For the status of the bank as a private corporation, see "Our History," SCB website. Accessed 16 September 2016, http://www.scb.co.th/en/about-scb/our-history/weathering-the-storm.
[68] Tordo *et al*, 97.

overall strength of private capital in Thailand. All these differences, however, are still relatively small and would not amount to an upgrade of this ITV to a higher trichotomous level.

2.4 India and Thailand's Overall Trust in Oil Markets

This section examines each component the vulnerability-interaction model proposes to make up decision-makers' overall trust level in oil markets' ability to ensure oil supply security in greater details in the cases of India and Thailand. The more cursory data examined in the plausibility probe of this thesis result in these two economies receiving the same trichotomous overall trust level. Based on analyses of annual report contents of pertinent NOCs and supported by facts related to the domestic and external contexts hypothesised to facilitate securitising, the conclusion is that the levels of these component parts accurately reflect the situations in each economy. Their overall levels of trust in the oil markets, therefore, should be similar, with Thailand's a little higher than India's. Thailand's more liberalised, but not totally free, domestic oil market governance is concordant with this finding.

2.4.1 Securitising Agents

In Chapter Three, both India and Thailand received the lowest trichotomous score for the securitising agent component, which is hypothesised to lead to the lowest level of trust in oil markets. This is based on the fact that the two economies each had at least one "traditional" NOC. In this comparative study, the relative coherence of these NOCs as securitising or lobbying agents and evidence of their securitising attempts are examined to ascertain if they are similar.

Unlike Thailand, India does not have a single vertically integrated NOC, but five central-level NOCs operating at different oil sectors.[69] This, however, does not necessarily mean that their collective coherence as securitising or powerful lobbying agents would be lower than Thailand's PTT. To investigate this further, and indeed, to see if there is actual evidence that NOCs routinely try to play up their importance in ensuring the oil supply security to the economy, a content analysis is offered here of annual reports of relevant NOCs in the five years leading to 2013.[70]

The results of the analysis indicate that NOCs in both countries trumpeted the various important roles they play to ensure oil supply security to their respective economies

[69] This excludes the Gas Authority of India Limited which is not related to crude oil supply. For the five Indian NOCs that do, see pages 47 and 48 in Chapter Three.

[70] The annual reports of years 2009 to 2013 are analysed when they are available (PTT). In cases when one of these years are not available (ONGC), those of earlier years are analysed. The earliest one examined is the ONGC 2007-08 Annual Report.

to comparable degrees overall.[71] There are, however, noticeable difference in emphasis. Indian NOCs highlight their effort in ensuring oil supply and other basic services to India's largely resource-deficient population in rural areas of the country, while Thailand's PTT focused more on its pivotal role in ensuring oil supply security to the economy as a whole and as a "national champion" company. In addition, the securitising or lobbying effort as manifested in the language used in the annual reports of both countries' NOCs appears to trend upward towards 2013.[72]

For India, the annual reports of ONGC and IOCL, representing the largest upstream and mid- to downstream respectively, are examined. To gauge their overall securitising effort, each appearance of the terms "strategic" and "security" is assigned the score of zero, one or two. The score of zero is assigned to applications not related to securitising. In the case of the word "strategic," a positive score is only assigned when it conveys meaning beyond being long-term and/or well-planned commonly used in commercial settings. The following applications, for example, receives the score of "two": "The task [satisfying large projected increase in energy demand] is huge for Indian companies and even more significant for your company, ONGC being the flagship company of this highly *strategic* and nationally critical sector."[73]

The score of "one" is assigned when the meaning of the language used is more ambiguous. For the word "security," a positive score is only assigned when it is used to highlight the company's importance in ensuring oil or energy security to the country. The following usage only receives a "one" because of its multifaceted message: "Apart from our mission as the national oil company which is ensuring energy *security* by supply[ing] the energy to the country's demand, our responsibility as a corporate enterprise registered in the Stock Exchange of Thailand also include enhancing economic prosperity by delivering high income to the state."[74] The following two unequivocal usages, however, each receives the score of "two": "With our footprint in 16 countries, we are geared to anchor India's energy *security*";[75] and "The mission is to seek and *secure* competitively priced crude oil and natural gas to ensure Thailand's energy *security*."[76]

The combined five-year average score of ONGC and IOCL for this general securitising agent category was 10.2 versus PTT's 26. This was due to PTT's very liberal

[71] Thailand's PTT receives a five-year average overall securitising score of 34.8 while India's ONGC and IOCL (see explanation in the next paragraph) together receive a five-year average overall score of 37.2.
[72] The total score spikes in 2011 for the PTT as that report has an unusually frequent mentioning of the company's effort to supply oil and other basic services to people affected by the great flood that devastated the economy, especially in the rural area, that year.
[73] *ONGC 2013-14 Annual Report*, 109.
[74] *PTT Annual Report 2013*, 16.
[75] *ONGC 2013-14 Annual Report*, inside cover.
[76] *PTT Annual Report, 2013, 45.*

use of the term "energy security" while emphasising its role in achieving it on behalf of the Thai nation. By contrast, the term "strategic" did not appear even once in all five years of PTT's annual reports. Indian NOCs also mentioned their role in ensuring Indian's energy security, but not as frequently. ONGC, India's upstream leader, occasionally mentioned the strategic role it played as the quotation above demonstrates. The main downstream NOC, however, did not do so as it only recently began to engage in overseas upstream oil projects, which are seen as "strategic" in popular imagination.

One possible explanation of PTT being apparently a more enthusiastic securitising/lobbying agent is that it faced greater competition from IOCs in the domestic market than its Indian counterparts. At the same time, Thailand's oil product pricing regime was more liberalised in 2013, hence it was more difficult for PTT to highlight its role of catering for the needs of the poor.[77] The combination of a greater need to justify its continued existence and the constraint the Thai oil pricing regime placed on its securitising option could well have resulted in more effort being put on trumpeting its mission of ensuring the country's energy security.

None of the Thai or Indian NOCs analysed directly or explicitly links its *raison d'être* with military or geopolitical rationales. This does not, however, mean that they did not act or serve as securitising or powerful lobbying agents for their continued existence and expansion, as the examples quoted above demonstrate. The intention behind the relatively frequent usage of the terms analysed in pertinent ways is made even clearer if we compare the NOC results to those of Exxon Mobil. It scores zero for all three years the analysis is conducted on the same two terms.[78] The contrast is less stark, but the result for Reliance Industries, the major Indian-based private oil firm, still shows a lower level of emphasising the concepts of "strategy" and/or "security."[79] In short, despite the difference in emphases, as further illustrated in the next sub-section, India and Thailand both deserve the same trichotomous score for their NOCs serving as strong and coherent securitising agents.

2.4.2 Domestic Context

Before delving into NOCs' securitising effort related to entrusting oil supply and distribution within the economy entirely to private firms, I will examine more closely the

[77] Thailand's oil fund "subsidy" system is supposed to stabilise oil product prices, not directly lowering prices to make them more affordable to the poor population. See footnote 39 above for more discussions.

[78] For 2013, 2010, and 2009. A typical example of the its usage of the term "strategic" reads like this: "Our additions come from a combination of the development of new fields, extensions to existing fields driven by further development, effective reservoir management, and application of new technologies, as well as *strategic* acquisitions."

[79] Reliance Industries' 2013-14, 2012-13, and 2009-10 annual reports are analysed. The three-year average of their usages of these two terms is 8.67 versus the ONGC and IOCL's combined score of 10.2.

facts on India and Thailand's evenness and levels of economic development, and the social context that would make such effort more persuasive if the conditions are relevant enough as described in Chapter Two.

Thailand was noticeably more urbanised and "well off" on a per capita basis than India in 2013 according to the data collected in the preliminary analysis in Chapter Three.[80] By these two measures, the objective domestic context should allow decision-makers in Thailand to have fewer worries about trusting an unfettered domestic market or relying solely on private oil firms to ensure oil supply security. This in turn would also make persuasive securitising by PTT with this domestic context more difficult according to the logic of the vulnerability-interaction model.

Per capita GDP, however, only shows the mean income of the population in an economy. Knowing how evenly the income is distributed among the population would provide a more accurate picture of the magnitude of poverty in the economy, which is more relevant to decision-makers' level of trust as hypothesised by the vulnerability-interaction model. The income distribution of India appears to be more even than that in Thailand around 2013 according to the measure of the GINI index.[81] At the same time, the difference between the two economies' five-year average per capita GDP between 2009 to 2013 is more or less the same as that of 2013 alone: Thailand's was almost exactly three times that of India's. These two facts taken together would mean that even though there were real differences in India and Thailand's urbanisation and prosperity levels, the gap in decision-makers' trust in the domestic market in the two economies would in fact be a little smaller.[82]

Returning to the content analysis of the annual reports of Indian and Thai NOCs, three groups of words are used to verify if these NOCs emphasise their importance in serving the rural and needy population that tend to be underserved by private firms. The results corroborate with the different objective domestic contexts of these two economies as

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[80] Its urban population was 48% versus India's 32% and its per capital GDP was $15,437 versus India's $5,268. Data sources of these are from the World Bank website. See Section 2.4.2 in Chapter Three for details.

[81] The only GINI index data for India from the World Bank is for year 2011 and the reading was 35.2. See "GINI index (World Bank estimate) – India," the World Bank website. Accessed 10 October 2016, http://data.worldbank.org/indicator/SI.POV.GINI?locations=IN. The reading for Thailand in 2011 is 39.26, and the five-year average reading between 2009 and 2013 is 38.74. In fact, this average already lower than the readings in the previous decades, which range from the low to mid-40s. See "GINI index (World Bank estimate) – Thailand," the World Bank website. Accessed 10 October 2016, http://data.worldbank.org/indicator/SI.POV.GINI?locations=TH. Putting these readings into context, Sweden, a net oil importing country reputedly with a relatively even income distribution has readings around between 26 and 27 during the same period. "GINI index (World Bank estimate) – Sweden," the World Bank website. Accessed 10 October 2016, http://data.worldbank.org/indicator/SI.POV.GINI?locations=SE.

[82] The degrees of urbanization in the decade leading to 2013 have risen steadily in both economies and so offers no further insight than that offered by the snapshot results of 2013.

discussed in the last paragraph. Indian NOCs, serving a less prosperous and more rural economy, highlighted their domestic distributive role much more forcefully than PTT. If we only focus on the group of words "poor, remote, or rural," the difference in the five-year average scores of the two economies is stunning: India's was 21 and Thailand's was 0.8. A typical usage of these terms by Indian NOCs reads like this: "… IndianOil bagged the Asia Retail Congress Award for Retail Excellence for the '*Rural* Impact' category for its innovative *rural* initiative… special format petrol/diesel stations in *rural* areas."[83]

Interestingly, the PTT used the second group of words more frequently. It scored a five-year average of 4.4 versus Indian NOCs' combined total of 3 for the words "(self)-sufficient/ sufficiency/reliant/reliance." This may be impacted by the philosophy of self-sufficiency preached by the popular late Thai monarch.[84] A positive score is assigned to the application of the third term analysed, "serve," when it emphasised the NOCs' role in serving the underserved or the national interest as a whole. In this category, both countries' NOCs scored very similarly: India's 3 versus Thailand's 3.6 (five-year average).

In sum, India scored more than three times higher in the combined results of these three categories of words related to the domestic context of securitising, 27 versus Thailand's 8.8 (five-year average). In addition to reflecting the greater pertinence of India's objective environment to securitising in the domestic context as hypothesised by the proposed model, the results illustrate Indian NOCs' eagerness, at least the downstream ones, to defend their "territory" by securitising. During the period studied, Indian downstream NOCs only shared a fraction of the costs related to maintaining the artificially low petroleum product prices called "under-recoveries."[85] In return, they gained an edge over private oil firms as these firms received little or no under-recoveries from the state as compensation.[86] The upstream leader ONGC, which did not enjoy such an advantage but had to share the burden of the costs, actually displayed even a lower overall domestic context score than PTT.[87] ONGC, however, did attain a score more than three times higher than PTT's for the

[83] *Indian Oil Corporation Annual Report 2011-12*, 48.
[84] For a discussion of this philosophy, see Darren Noy, "Thailand's Sufficiency Economy: Origins and Comparisons with Other Systems of Religious Economics," *Social Compass* 58-4 (2011): 593-610.
[85] For a discussion of under-recoveries and how the fiscal burden of them were shared, see Agarwal and Soni, *Petroleum Product Pricing Reforms in India*, 1-3. The burden borne by downstream NOCs appear to be getting larger over the years, but still less than a third of the total subsidies. See *Petroleum Prices, Taxation and Subsidies in India* (Paris: International Energy Agency, 2009), 6-10.
[86] Desai *et al*, *Public Enterprises, Government Policy and Impact on Competition*, 20. Also see Kieran Clarke, Shruti Sharma, and Damon VisDunbar, *India Energy Subsidy Review – A biannual survey of energy subsidy policies* (Geneva: International Institute for Sustainable Development, 2014), 19.
[87] ONCG's five-year average of overall domestic context score is 3.6 versus PTT's 8.8 and IOCL's 23.4.

group of words "poor, remote, or rural," which in turn was only about one seventh of its downstream counterpart in India.[88]

India's lower trust score in the domestic oil market in the plausibility probe remains accurate after a more detailed examination of the evenness and level of economic development of India and Thailand as well as the securitising efforts of their NOCs in the domestic context. As suggested by the vulnerability-interaction model, Thailand did seem to trust the functioning of the domestic oil market more than India in the years leading to 2013. It had a much more market-confirming domestic oil product price regime as it did not artificially set the prices of oil products.

2.4.3 External Securitising Context

India and Thailand both received the middle score for their level of trust in the international oil markets in the plausibility probe. In that preliminary study, this score was assigned to a polity that was neither a formal or de facto ally nor having a relationship that may be interpreted as "neutral-conflictual" with the United States around 2013. The vulnerability-interaction model hypothesises that a negative relationship with the United States would create an external context that can easily be exploited to securitise the untrustworthiness of the international oil markets than one that is close.

The reasoning of the proposed model is based on the fact that the United States has been the hegemonic power of the international political and economic systems for decades. The United States has been the creator and rule and agenda setter in most international organizations, including the one that represents net oil importing advanced economies, the IEA. The United States is also the single country that had the naval power to underwrite the security of or block off sea lanes most oil shipped to Asia have to use.[89] U.S.-based corporations, including major IOCs, have been dominant players in the international oil markets. All these objective facts may be manipulated to sow doubts in the fairness of the existing international oil markets by lowering states' trust in these markets. One way to do so is to play up the zero-sum economic nationalistic worldview, which assumes the United States would try by any means to hang on to its historical dominance. The goal is to bolster its "power, prestige, or the prosperity" at the expense of other nations, especially those having a conflictual relationship with it.[90]

[88] ONGC's five-year average for this group only is 2.6 versus PTT's 0.8 and IOCL's 18.4.
[89] Hughes and Long, "Is There an Oil Weapon?" 173-180.
[90] The quoted phrase was supposed to be the goals of economic nationalists, even if the means adopted to achieve these goals can be very diverse and not necessarily zero-sum in orientation. See Helleiner, "Economic Nationalism as a Challenge to Economic Liberalism?" 310 and footnote 59 in Chapter Two for more discussions.

India and Thailand's middle score means this external context should not have much salience in securitising oil supply risks directly or indirectly related to the United States. Partly due to this lack of salience and partly due to the unlikelihood of discussions of the state's bilateral relationships with the hegemonic power in NOC annual reports, no content analysis on them is conducted.

Instead, in this pairwise comparison, Indian-U.S. and Thai-U.S. relationships are examined more closely to see if they are indeed very similar and if not, whether the difference would likely lead to a notable difference in decision-makers' level of trust in these two economies concordant with the expectation of the proposed model. Indian-U.S. politico-strategic relations in the decade leading to 2013 improved tremendously compared to during the Cold War, or even the early post-Cold War years. Despite the talk about the two being natural allies in this decade, however, their relationships did not seem to have developed to the level of closeness of actual allies yet as of 2013.

Since the signing of the "New Framework for the US-India Defense Relationship" agreement in June 2005[91] and the issuance of the joint statement between President George W. Bush and Prime Minister Manmohan Singh a month later,[92] many commentators have noted the blossoming relationship between the two countries, especially as a contrast to the Sino-American relationship.[93] Other commentators take a generally optimistic, but more neutral, view of the bilateral relationship between New Delhi and Washington. While acknowledging it to be at a historic high, they also call to attention lingering issues such as Indian-Pakistan animosity, India's continuing arms acquisition from Russia,[94] U.S. worries about "strategic autonomy" of India,[95] U.S. demands for "Indian allegiance" and a faltering

[91] "New Framework for the US-India Defense Relationship," June 28, 2005. The Rumsfeld Papers website, accessed 11 November 2016, http://library.rumsfeld.com/doclib/sp/3211/2005-06-28%20New%20Framework%20for%20the%20US-India%20Defense%20Relationship.pdf.

[92] "Joint Statement Between President George W. Bush and Prime Minister Manmohan Singh," The White House website, accessed 11 November 2016, https://georgewbush-whitehouse.archives.gov/news/releases/2005/07/20050718-6.html.

[93] See for example R. Nicholas Burns, "America's Strategic Opportunity with India: The New U.S.-India Partnership," *Foreign Affairs* 86-6 (Nov – Dec 2007): 131-146; Robert D. Kaplan, "Power Plays in the Indian Ocean: The Maritime Commons in the 21st Century," in *Contested Commons: The Future of American Power in a Multipolar World*, ed. Abraham M. Denmark and James Mulvenon (Washington, D.C.: Center for a New American Security, 2010), 185; Namrata Goswami, "The Logic of Closer US-India Relations," The Diplomat, June 14, 2016. Accessed 11 November 2016, http://thediplomat.com/2016/06/the-logic-of-closer-us-india-relations/. Another example with a very different theoretical perspective and scope than the others but also sounds optimistic of this relationship is by Jarrod Hayes, *Constructing National Security: U.S. Relations with India and China* (New York: Cambridge University Press, 2013), 91-98.

[94] John Pedro, "United States-India Defense Relations: A Strategic Partnership for the 21st Century," *Cornell International Affairs Review* 9-1 (2016). Accessed 11 November 2016, http://www.inquiriesjournal.com/a?id=1320.

[95] Tanvi Madan, "The U.S.-India Relationship and China," January 20, 2015, Brookings Institute website. Accessed 11 November 2016, https://www.brookings.edu/opinions/the-u-s-india-relationship-and-china/.

Indian economy making it a "less attractive strategic partner to the U.S."[96] Priya Chacko goes further by pointing out that the notions of American exceptionalism and "Indian civilizational exceptionalism" are fundamentally incompatible, which act as a "key barrier" to the two countries developing a truly "special relationship" even at a period of power transition fraught with "ontological insecurity" due to a rising China.[97]

U.S.-Thai relations were heading in the opposite direction during the same timeframe. They continued to trend downward from its height during the Cold War, notwithstanding the temporary boost they received from the common goal of countering terrorism in the years immediately following the 9/11 attacks and the American invasion of Iraq in 2003.[98] The two allies' respective relationship with China also featured prominently in their relationship with each other, but also roughly having an opposite effect as in the case of Indian-U.S. relationship. In an observer's words, "differing threat perceptions about China…contribute to a sense that the alliance, while institutionally sound, suffers from a lack of strategic alignment."[99]

The 2006 military coup that ousted Prime Minister Thaksin Shinawatra and the political instabilities in the years leading to 2013, not to mention the military coup in 2014, have put further strains on the alliance. By the last few years of the first decade of this century, the two Cold War and counter-terrorism allies were on divergent paths again, even if the benefits of the alliance were still too great for either to rush for the exit.[100] One such benefit is the annual Cobra Gold exercise that takes place in Thailand. It is the largest multinational military exercise in the Asia Pacific with the goal f advancing regional security and humanitarian operations. The exercise was only scaled down, but not cancelled even after the 2014 coup.[101] Thailand was chosen as the first stop of President Obama's first trip

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[96] S. Paul Kapur and Sumit Ganguly, "The Transformation of U.S.-India Relations – An Explanation for the Rapprochement and Prospects for the Future," *Asian Survey* 47-4 (July/August 2007): 653-655.

[97] He explains American exceptionalism as entailing "the notion that American ideals and institutions are universal and that the United States has an obligation to exercise global leadership." On the other hand, Indian civilization exceptionalism entails seeing "India as a responsible state with a non-coercive, prudent, exemplar-style approach to moral leadership that seeks a better path to modernity." A New 'Special Relationship'?: Power Transitions, Ontological Security, and India-U.S. Relations," *International Studies Perspectives* 15 (20154): 343.

[98] For a history of that relationship from its height in the Cold War, through the doldrums in the 1990s and its partial "revival" in the early 2000s, see Paul Chambers, "U.S.-Thai Relations after 9/11: A New Era in Cooperation?" *Contemporary Southeast Asia* 26-3 (December 2004): 460-476.

[99] Emma Chanlett-Avery, "Thailand: Background an U.S. Relations," *Congressional Research Service Report RL32593*, June 21, 2010, 10.

[100] Ibid. Also see Emma Chanlett-Avery, "Political Turmoil in Thailand and U.S. Interests," *Congressional Research Service Report R40605*, May 26, 2009; Lewis M. Stern, "Diverging Roads: 21st-century" *Strategic Forum*, No. 241, June 2009. Institute for National Strategic Studies, National Defense University.

[101] Richard S. Enrlich, "Obama Scales down annual Cobra Gold military exercise in protest of Thailand coup," The Washington Times, February 9, 2015. Accessed 20 February 2015,

to Southeast after his re-election to shore up the already sagging relationship, even if his visit to Myanmar received the greatest attention for that trip.[102]

I argue that the closer examination of India and Thailand's relationships with the United States in this sub-section so far justifies the middling score they received, although they arrived there from very different starting points. The relationships have also been predicated on very different legal and institutional frameworks and appear to be trending in different directions.

Were these differences large enough to impact on decision-markers' calculations of the oil supply risks their economies faced around 2013 or did they make securitisation easier by NOCs and other interested parties in one of the countries? My assessment is "no" on both counts. First, as mentioned earlier, a middle score is not hypothesised to have much salience on decision-makers' trust level in the international oil markets. In addition, improving India-U.S. relations in the last decade would make securitising American response to such developments as the Indian-Iranian oil trade and investment projects more difficult.[103] In the case of Thailand, the prominent role played by American oil firms' in the economy's oil sectors also makes securitising oil supply with the country's generally downward relations with United States in the last few decades less relevant.

2.4 Implementation Capabilities of India and Thailand

This section tests the proposition that India and Thailand had a similar level of overall capabilities to implement strategic oil supply measures in 2013. First, an additional implementation capability especially applicable to countries with traditional NOCs is examined with respect to India and Thailand's situations. Then, the two countries' diplomatic capability to render support to state intervention in oil supply is re-examined with greater specificity than the nature of their UN memberships, used as the proxy in the plausibility probe.

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http://www.washingtontimes.com/news/2015/feb/9/obama-protests-thailand-coup-scales-down-annual-co/.

[102] For an analysis of the goal of that trip and issues on the U.S.-Thai agenda during Obama's visit there, see Vikram Nehru, "Obama in Southeast Asia: Symbolism or Substance?" November 17, 2012, Carnegie Endowment for International Peace website. Accessed 25 February 2017, http://carnegieendowment.org/2012/11/17/obama-in-southeast-asia-symbolism-or-substance/ejm8#thailand.

[103] Iran has long been a major supplier of crude oil to India. Before the U.S. sanction on Iran was lifted in January 2016, India's opposition to the sanction at least put some stress on the Indian-U.S. relationship at times. See Chacko, "New 'Special Relationship'?" 342; Tanvi Madan, "India and the Iran deal," Brookings Institute website, July 20, 2015. Accessed 12 November 2016, https://www.brookings.edu/blog/markaz/2015/07/20/india-and-the-iran-deal/; and Armin Rosen, "Why India Is Finally Complying With Sanctions on Iran," March 15, 2013 *The Atlantic*. Accessed 12 November 2016, http://www.theatlantic.com/international/archive/2013/03/why-india-is-finally-complying-with-sanctions-on-iran/274063/.

Taking into account a more in-depth investigation, India and Thailand's overall capabilities in implementing strategic oil supply measures appear to remain very similar. India appears to be slightly weaker than Thailand in one of the additional capabilities examined. Its NOCs were less profitable than Thailand's and they also seemed to have less autonomy of how to use the profits.[104] India, however, definitely had a greater capability and indeed more aggressively engaged in oil diplomacy than Thailand during the period studied.

2.4.1 NOC Profitability

The profitability of NOCs is examined here as an additional implementation capability. The logic is that since all central-level NOCs in India and Thailand are publicly traded domestically, to a large degree, they can use their net profits to sustain and expand their operations independent of the financial capabilities of the state.[105] This in turn results in the adoption of higher levels strategic oil supply measures by their host economies as defined in this project. These may include more overseas equity E&P projects or NOCs controlling a higher percentage of the economy's crude oil supply through either E&P or trading. Both the absolute amount and its ratio relative to the company's assets or equity are taken into consideration to determine if the NOCs have similar capability in sustaining or expanding themselves with their net profits.

The combined five-year average (2009-2013) of the net profits of India's five NOCs[106] was a little more than twice that of PTT's.[107] By this measure, Indian NOCs appeared to be less profitable as the oil consumed in India in 2013 was almost 3.5 times that in Thailand.[108] The same five-year averages of the net profits to equity or net worth ratios of Indian and Thai NOCs were similar. The four-NOC average of India's was 12.77% versus PTT's 13.98%. Data for the smaller upstream Indian NOC Oil India Limited is not available and hence is not factored into the calculation. Otherwise, the two ratios would be even closer

[104] The generally higher ownership stakes the Indian government has in its NOCs than the Thai government on PTT (especially when the 15% owned by the Thai sovereign wealth fund is not counted) partly contributes to this statement. In addition, simply judging by the "NOC Corporate Governance" sections on ONGC and PTT in the World Bank study on NOCs, ONGC has less functional independence than PTT. See Tordo *et al*, *National Oil Companies and Value Creation, Volume II*, 29 and 103.

[105] There are other regulatory or political restrictions to NOC activities. Different corporate governance structures would also impact on NOCs' financial autonomy as discussed in the last footnote. Still, everything being equal, the more funds NOCs have in the form of net profits from their operations, the greater capability they would have to maintain and expand their activities.

[106] The sources of the information are from the companies' annual reports. IOCL and Hindustan Petroleum's annual reports provide the profits in U.S. dollar. as well as in Indian Rupees (INR). The other three companies only provide the amount in INR and Conversion rates to US$ with the corresponding year are used to compute the US$ equivalent for comparison with PTT's profits, which also need to be converted from Thai Bhat to U.S. dollar. See Table A12, Appendix C for details.

[107] Indian NOCs' combined total net profit is US$6352.94 million and PTT's is US$2,855 million.

[108] Calculated with *BP Statistical Review of World Energy June 2014.*

as upstream firms appear to be more profitable than downstream ones in India as oil products were still subjected to de facto price control during the period studied.[109]

2.4.2 Oil Diplomacy Capability of India and Thailand

Both the size and specialty of a country's diplomatic establishment are important to carry out effective oil diplomacy. Political negotiations, which are inseparable from oil diplomacy, take time, resources, and skills. In this section, therefore, the specialty of and spending on India and Thailand's foreign affairs and other pertinent ministries that can support their respective states' and NOCs' overseas oil supply activities are examined.

India, with a GDP about four and a half times that of Thailand in the years leading to 2013, is expected to have a much larger diplomatic establishment in absolute terms.[110] The results of the comparison of the expenditures of the two countries' respective ministries handling foreign affairs, the Indian Ministry of External Affairs (MEA) and the Thai Ministry of Foreign Affairs (MFA) during the period studied, more than confirm this expectation. The Indian ministry spent almost six times more than its Thai counterpart.[111] Another way to express this difference is that India spent on average 0.08% of its GDP to run its MEA while Thailand spent 0.06% of its GDP to run its MFA.[112]

This study refines these numbers by taking two actions. First, India's substantial "loans and advances to foreign governments," about 13% of the budget of its MEA,[113]is excluded from the calculation. Second, in Thailand, the Department of Mineral Fuels (DMF) under the Ministry of Energy has responsibilities of promoting hydrocarbon E&P in areas

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[109] The major Indian upstream firm ONGC's five-year net profits/net worth ratio is 19.8% while those of the three downstream firms' ratios are 11.6%, 11.14%, and 8.48%.

[110]India's five-year average GPD (2009-2013) is US$1,715,400 million and Thailand's four -year average GDP (2010-2013) is US$382,178.25 million. See "GDP (current US$)," The World Bank website. Accessed 20 November 2016, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD. Only a four-year average is done on Thailand because data on the expenditures of its Ministry of Foreign Affairs are only available from 2010-14. See the next footnote.

[111] To be precise, it is 5.9 times more. The source of the MEA budgets of 2009-2013 is from the [Indian] *Ministry of External Affairs Annual Reports 2013-14*, 203; the sources of the Thai MAF expenditures of 2010-13 are from *Thailand's Budget in Brief Fiscal Year 2014*, 75, *Thailand's Budget in Brief Fiscal Year 2012*, 74, and *Thailand's Budget in Brief Fiscal Year 2011*, 62.

[112] As a comparison, the U.S. State Department and foreign aid budget (including military aid) for 2014 was estimated to be US$47.8 billion, but US$35 billion of that was for aids. After deducting that out, the U.S. spent about 0.073% of its GDP to staff its diplomatic establishments. For the total State Department and USAID budget, see Executive Budget Summary of the United States of America Department of State, Fiscal Year 2014, 2. Accessed 25 February 2017, https://2009-2017.state.gov/documents/organization/207305.pdf. For the total foreign aid budget, see Nick Thompson, "Seventy-five percent of U.S. foreign military financing goes to two countries," November 11, 2015 CNN websites. Accessed 25 February 2017, http://edition.cnn.com/2015/11/11/politics/us-foreign-aid-report/. U.S. GDP data is obtained from the World Bank website, http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=US.

[113] The recipients of the largest of these loans and advances were not oil producing countries, and hence these loans would not be related to oil diplomacy. See the complete list of recipients for fiscal year 2011-12 on page 209 of the MEA annual report of that year.

overlapping with neighbouring countries. This and related functions may reasonably be considered the implementation of oil diplomacy in some ways.[114] Even generously adding half of the DMF expenditures onto that of the MFA to do the calculation, India still spent a slightly higher proportion of its resources on maintaining a diplomatic corps that can be mobilised to conduct oil diplomacy.[115] In fact, another Indian government department also has a lot to do with the execution of oil diplomacy, as the discussions two paragraphs below illustrate. It is obvious that India devoted more resources to engaging in oil diplomacy than Thailand both in absolute and relative terms in the years leading to 2013 even without factoring in the budget of this department.

India's oil diplomacy also showed a greater concentration of effort and a tighter focus. In 2009, the Energy Unit within the Indian MEA, formed in 2007, was updated to a "full-fledged division."[116] This unit provides concerted effort to enhance India's energy security by "making *sustained diplomatic interventions* on energy issues; assisting the government's efforts to further diversify the country's supply base for oil, gas…interfacing with nodal Energy Ministries; facilitating R&D tie-ups, and technology transfer…[emphases added]"[117] Oil diplomacy appeared to be a major focus of this division, as well as the whole diplomatic corps. MEA annual reports of this period routinely documented dozens of oil supply cooperation projects Indian NOCs and government participated in overseas. As the Chairman of ONGC puts it, the company was "thankful to the diplomatic support from the Indian government for catalysing" its expansion and in establishing its overseas E&P subsidiary, OVL.[118]

In fact, the practice of oil diplomacy, if less formally or professionally, entered the agenda of the Indian Ministry of Petroleum and Gas (MPNG) even earlier. In 2005, two years before the predecessor of MEA's Energy Division was instituted, the MPNG formed an International Cooperation Division to facilitate "*bilateral cooperation* with foreign countries both in the upstream and downstream sectors [emphasis added],"[119] the classic feature of oil diplomacy. This division employed mechanisms such as "meetings at the level of Heads of State/Government/Oil Minister of hydrocarbon-rich countries," and "holding high-level conferences, such as the India-Africa Hydrocarbons Conference… to seek engagement with oil & gas producing countries/international oil companies" to achieve oil

[114] One of DMF's declared strategies reads: "Enhance national energy security through the pursuit and development of energy sources and power systems from both domestic and international sources…" *[Thai] Department of Mineral Fuels, Ministry of Energy Annual Report 2013*, 14
[115] India's is 0.7 versus Thailand's 0.6. Sources of the DMF expenditures for the pertinent years are from the same Budget in Brief reports as listed in footnote 111, but on pages 77, 76, and 67 respectively.
[116] MEA Annual Report 2011-12, 15.
[117] Ibid.
[118] ONGC Annual Report 2013-2014, 4.
[119] MPNG Annual Report 2007-08, 117.

diplomacy objectives.[120] MPNG officials no doubt provided much needed expertise on oil supply issues to the professional diplomatic corps.[121]

By contrast, no such resources or focused effort were exerted within the Thai MFA or the DMF. There was no special division or unit on oil or energy diplomacy. This may be a reflection of Thailand's smaller diplomatic clout in absolute terms outside of its immediate neighbourhood. Its oil or energy diplomatic efforts covered mainly the actual and potential hydrocarbon producing areas overlapping with its neighbours and energy cooperation among Southeast Asian economies. Accelerating hydrocarbon E&P in the Malaysia-Thailand Joint Development Area through international cooperation and supporting the development of the Trans-ASEAN gas pipeline, for example, were the only two international projects mentioned in the DMF 2013 annual report.[122] While energy security and cooperation has been mentioned a number of times, oil diplomacy or other oil related issues was not mentioned even once in the MFA's 2012 annual report. The most pertinent description of related effort reads, "… ambassadors and consulates general were also able to discuss 'new' issues such as science diplomacy and energy diplomacy…"[123] A likely contributing reason for this relative indifference is that Thailand had greater confidence than India in acquiring its oil supply through international markets with the prominence of IOCs in its petroleum sectors.

3. Politics of Oil in China

Sustained large-scale production of oil and gas emerged in China in the early 1960s with the development of the Daqing oilfield even if oil and gas had been discovered and used for two millennia.[124] In modern China, all major oil companies have been state-owned and operated, from the 19th century Qing Dynasty bureaucracy, to the Nationalist government's China Petroleum Corporation headquartered in Shanghai before moving to Taiwan in 1949, and on to the People's Republic's line ministries, which were transformed into national oil companies (NOCs) in the late 1980s.[125] The corporatization and public offerings of stocks of subsidiaries of major Chinese NOCs around the turn of this century

[120] MPNG Annual Report 2012-13, 143.
[121] Information on Meckling *et al*'s studies on Indian NOC internationalization also provides ideas for these two paragraphs, especially on page 17 of "Oil & State Capitalism."
[122] Pages 6 and 16 respectively.
[123] MFA 2012 annual report, p93.
[124] Lianyong Feng, Yan Hu, Charles A. S. Hall, and Jianliang Wang, *The Chinese Oil Industry: History and Future* (New York: Springer, 2013), 3-6.
[125] *Ibid*., 3-8. Also see Wang Bo, "Historical Development and Characteristics of Taiwan's Petroleum Industry before 1949," *Chinese Communist Party Fujian Provincial Committee Journal* 12 (2000): 72-76 [汪波，1949 年以前台湾石油工业的发展历程与特点， 中共福建省委学报 2000 年第 12 期]; Bo Kong, *China's International Petroleum Policy*, 7-18, and *CPC Corporation, Taiwan 2014 Annual Report*.

has yet to lead to the divestment of their parent companies or turn these subsidiaries into majority privately-owned. Private oil companies have been allowed to participate in the fringes, such as domestic firms operating small oil refineries and gas stations in rural areas, and IOCs partnering with NOCs in technologically challenging E&P projects and marketing oil products.

Oil product pricing in China has gradually become more market-based since the mechanism created under the Oil and Oil Product Price Reform Plan of 1998 replaced direct government control and then the "dual-track system" of previous eras.[126] While not totally free-floating as of 2013, this pricing system provided room for both domestic and international private oil companies to operate in China's domestic retail market in the decade preceding 2013. Still, oil supply to the Chinese economy was firmly in the hands of the state with near total control of oil import and indigenous hydrocarbon resources during the period studied, more so than in India.

On the other hand, with still considerable but dwindling hydrocarbon resources, China's OV was actually relatively low among Asian net oil importing economies as in India. The strength of private capital and trust in oil markets appeared to be also low, again as in India. The implementation capabilities of the two countries, however, was noticeably different. H2 of the vulnerability-interaction model predicts that under such a circumstance, this factor would explain the difference in the level of state intervention according to the logic of the model. The sub-sections below show China's higher capability appears to explain its adoption of a higher level of strategic oil supply measures than India in 2013.

Comparison of China and India in 2013: The second pairwise comparison in this Chapter is between China and India. The goal of the comparative study in this section is to further investigate the cross-case validity of H2 of the vulnerability-interaction model, which strives to explain the causes of variations in the level of strategic oil supply measures adopted by net oil importing economies at any given time. The only substantive difference in the levels of the four explanatory variables between China and India with 2013 data is that China had a trichotomously higher overall implementation capability according to the results in the plausibility probe. If these initial results are confirmed in this study, they would also validate the proposition that a net oil importing economy with a higher overall implementation capability would adopt a higher level of strategic oil supply measures if everything else remains equal.

[126] For a gist of this mechanism, see Jin Zhang and Mingjia Xie, "China's oil product pricing mechanism: What role does it play in China's macroeconomy?" *China Economic Review* 38 (2016): 210-211.

The 2013 data of these two economies presented in the plausibility probe show that their conditions match those stipulated in H2. This means that only one of their four explanatory factors differ in trichotomous levels and their respective DV levels differ in a direction that fits the expectation of the reasoning of the proposed model. This is summarised below:

Economy	Strategic Oil Supply Measures Adopted (DV Level)	OV (IV) Level	Strength of Private Capital	Overall Trust in Oil Markets	Overall Implementation Capability
China	High	Low	Low	Low	High
India	**Medium**	**Low**	**Low**	**Low**	**Medium**

Table 4.3 Trichotomous Levels of All Variables for China and India in 2013 in preliminary study

After the levels of each of these variables in the two economies are reassessed with additional and more precise data in this comparative study, the cross-case validity of H2 is confirmed. China adopted a notably higher level of strategic oil supply measures than India in the decade leading to 2013. India's slighter higher OV does not increase further. The strength of private capital in the Chinese petroleum sectors appears to further weaken, but the cause of that, state orientation, is already factored in the other explanatory factors.[127] China's slightly lower overall trust level in the oil markets remains. In short, these three explanatory factors remain within the same trichotomously low level. By contrast, China's overall capability to implement strategic oil supply measures appears to become even higher when the new measures are taken into account. Hence China's capability was definitely one trichotomous level higher than India's.

3.1 Strategic Oil Supply Measures Adopted by China and India

China adopted a higher level of strategic oil supply measures than India in 2013 according to the two measures that make up the composite scores of the strategic oil supply indicator in Chapter Three. Both Chinese and Indian NOCs engaged in oil supply projects overseas and still possessed indigenous oil resources in the years leading to 2013. The same two additional measures used in the comparison of India and Thailand, therefore, are appropriate to more precisely ascertain China and India's DV levels. The first is the overseas oil supply investments Chinese and Indian NOCs engaged in. The second is how much relative preference was given to NOCs in the E&P of indigenous oil sources. The next two sub-sections verify that the Chinese state indeed adopted a considerably higher level of strategic oil supply measures than India during the period studied.

[127] The economy's OV and decision-makers' trust in oil markets make up the state's orientation according to the vulnerability-interaction model. See section 3.4 in Chapter Two for more discussion.

3.1.1 Level of Chinese Overseas Oil Supply Investments

Section 2.1.1 above provides the gist of Indian NOCs' overseas oil and gas projects. How is the scale of those projects compared to the ones Chinese NOCs engaged in during the period leading to 2013? Recent studies on the subject all agree that Chinese NOCs have pursued these projects more energetically and successfully.[128] One yardstick of the sizes of these investments is the value these companies spent on oil and gas company mergers and acquisitions (M&A) globally. Between 2008 and 2013, Chinese NOCs spent US$127 billion cumulatively on these acquisitions compared to the US$10.8 billion spent by Indian NOCs.[129] The size of Chinese NOC oil and gas transactions grew exponentially from a negligible share of all available oil and gas deals globally in 2007 to 4% in 2008 and to 16% in 2013.[130] This timeline fits in with Meckling *et al*'s analysis that Chinese NOC "internationalization" entered a third phase since 2008 in which the Chinese state acted as a robust "resource supplier" of the process. The two motivations they advanced for Chinese state support of this process in this period are not related to oil supply security, but seem to be unique Chinese circumstances that do not contradict with the reasoning of the vulnerability-interaction model. First is Chinese state financial institutions responding to the Chinese government's "going out" policy, which encourages all Chinese state-owned enterprises, not just NOCs, to expand overseas. Second is finding productive outlets for China's "mammoth USD" foreign exchange reserves.[131] Andrews-Speeds and Dannreuther describe Chinese NOCs' overseas activities as a "resurgence" since 2009.[132]

Another way to compare the scale of overseas oil and gas projects which is more pertinent to oil supply security in the more immediate term is the oil actually developed from those projects. The amount generated by the major Indian NOC that carried out such projects, the OVL, as noted in Section 2.1.1, was 8.357 MMT during the year 2013-14 in at least eight countries. All three major Chinese NOCs, China National Petroleum Corporation (CNPC), China National Petrochemical Corporation (Sinopec), and China National Offshore Oil Corporation (CNOOC), and their publicly-listed subsidiaries, as well as some minor but also state-owned firms, such as the China National Chemicals Import and Export Corporation (Sinochem), engaged in these projects.[133] CNPC has been the largest Chinese

[128] See for example, Meckling *et al*, 1167; Carl, Rai, and Victor, 19; and Lydia Powell, "Geo-politics of India's equity investments in energy," *Energy Security Insights* 7-3 (July – December 2012): 3.
[129] Meckling *et al*, 1167.
[130] Brian Lidsky, "Global O&G Transactions Q1 2014 Review," PLS Inc. and Derrick Petroleum Services, 24. Accessed 12 December 2016, http://www.plsx.com/ma/downloads/q1_2014_final_ma_27pgs.pdf.
[131] Meckling *et al*, 1170-1171.
[132] *China, Oil and Global Politics*, 73 – 75.
[133] For lists of different oil related overseas investments these companies engaged in between 1992 to 2007, see Kong, *China's International Petroleum Policy*, 170-189.

NOC and is used here to compare with its counterpart, OVL.[134] It developed 59.20 MMT equivalent of "equity" oil and gas [权益当量油气] from projects in 34 countries in 2013.[135] If we go back five years to 2008, CNPC produced 35.5 MMT equivalent of equity oil and gas that year.[136] While it is not clear how many countries CNPC developed oil in at the time, it signed 15 new oil and gas development contracts that year with countries including Venezuela, Niger, Qatar, Costa Rica, and Iraq.[137] OVL produced oil and gas in 16 countries, and yielded 8.78 MMT equivalent of equity oil and gas in 2008-09.[138]

In sum, China's six-year accumulative overseas oil and gas M&A ending in 2013 was more than eleven times that of India's. The oil and gas produced from overseas projects by the biggest Chinese NOC was more than four times in 2008, and more than seven times in 2013 than that produced by the India's major upstream NOC. This number would be at least doubled if we also count the amount developed by other Chinese NOCs.[139] Judging by this additional measure alone, China's strategic oil supply measure level was notably higher than that of India in the years leading to 2013, even if we factor in the almost three times higher oil consumption of China in 2013.

3.1.2 Preference to NOCs for Development of Indigenous Oil in China

China had a higher oil self-sufficiency rate than India in 2013, and both countries' NOCs engaged in the E&P of indigenous oil resources.[140] Examining the relative preference given to their respective NOCs in this domain is, therefore, an appropriate measure of the level of strategic oil supply measure they adopted. The Indian indigenous oil E&P regime in the years leading to 2013 was present in section 2.1.2 above. In short, the NELP that governed domestic oil and gas E&P in India did not give preference to state-owned or even domestic private oil firms on a legal basis.

Chinese oil exploration laws were heavily tilted in favour of NOCs and other SOEs and more restrictive to private capital participation than India's. According to an

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[134] CNPC is more akin to ONGC, but OVL is the ONGC's subsidiary that engages in overseas projects. Of course, CNPC and ONGC are not really comparable in the sense that the former is a vertically integrated firm but the latter is an upstream oil firm. Since most overseas oil and gas investments have been upstream projects, the comparison of these firms are still appropriate.
[135] "2013 Figures – CNPC Publishes Year 2013 Social Responsibility Report," CNPC news centre website [中国石油发布 2013 年度社会责任报告数字 2013]. Accessed 15 January 2015, http://news.cnpc.com.cn/system/2014/04/21/001483270.shtml.
[136] *CNPC Year 2008 Annual Report* [中国石油天然气集团公司 2008 年度报告], 9.
[137] Ibid.
[138] *ONGC Annual Report 2008-09*, 3.
[139] CNPC's overseas investments were estimated to be about 49% of those made by all three major Chinese NOCs as of 2011. See Zhao Qingsi, *International Cooperation and Chinese Energy Diplomacy – Concepts, Mechanisms and Pathways* (China: Law Press, 2012), 219. [赵庆寺 国际合作与中国能源外交—理念，机制与路径华东政法大学出版社]
[140] Using the data in the *BP Statistical Review of World Energy June 2014* to do the calculation, China's was 41.02% and India's was 23.94% .

international law firm report on Chinese energy and natural resources laws, the "Chinese government owns all oil and gas resources in China. Exploration and exploitation of oil and gas resources are currently only granted to state-owned enterprises (SOEs) through set procedures."[141] These included the three central-level NOCs, collectively known as the "three barrels," [三桶油] and Yanchang Petroleum Group, an SOE of the Shaanxi Provincial Government.[142]

This was especially true for the E&P of conventional oil and gas, which offered only "very limited participation for private firms, either domestic or and foreign."[143] Only the "three barrels," were authorised to cooperate with foreign companies by entering into production sharing contracts (PSC) with them. "Under the PSC structure, the Chinese partners hold the exploration and exploitation rights while the foreign partners serve as the operator managing the exploration, development and production of the venture." [144] Technically, E&P "rights could also be obtained through public bids," but in practice, this rarely happened.[145] Private firms appeared to have slightly more leeway to participate in the E&P of unconventional oil and gas, such as coalbed methane, oil shale, oil sand and shale gas. There are, however, still many uncertainties and ambiguities in the implementation of these recent deregulation developments, an issue which is beyond the scope of this study.[146] The Chinese state, therefore, had a much tighter control over who and how Chinese hydrocarbon resources were developed as of 2013 and hence adopted a higher level of this particular strategic oil supply measure than India.

3.2 Oil Vulnerabilities of China

The same additional market risk, oil intensity of the economy, and additional supply risk, the concentration of the sources of oil supply, are used to verify India and China's OV levels in this comparative study. Again, the Indian economy's oil intensity in 2013 was 0.027, while China's was 0.031, calculated with the same method and sources of data as in the first pairwise comparison. This indicates that China's economy was more oil intense than India's. China, therefore, was almost 15% more vulnerable to increase in oil prices than India in 2013 by this additional measure alone.

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[141] Jin Xiong, Yan Zhao, and George Zhao, "Oil and gas regulation in China: overview," *Energy and Natural Resources Jurisdictional Guide 2014*. Accessed 10 December 2016, http://us.practicallaw.com/cs/Satellite?blobcol=urldata&blobheader=application%2Fpdf&blobkey=id&blobtable=MungoBlobs&blobwhere=1248118002173&ssbinary=true.
[142] See "About YCPC," website of Yanchang Petroleum. Accessed 10 December 2016, http://english.sxycpc.com/list_content.jsp?urltype=tree.TreeTempUrl&wbtreeid=1002.
[143] Xiong *et al*.
[144] Ibid.
[145] Ibid.
[146] Ibid.

The same modified HHI Index, weighted with the comprehensive risk of individual supplying countries, is used to measure the concentration of the sources of oil supply to China and India. China's score in 2013 was 66.89 compared to India's 87.24. China, therefore, had a 23.32 percent lower physical supply risk of oil than India by this measure alone.[147]

India's 2013 OV score calculated with the four measures in the preliminary study was slightly higher than that of China. The two economies' OV widens slightly after adding the two measures here, but would be still at the same trichotomous level.[148]

3.3 Strength of Private Capital in China

The historical-institutional source of the strength of private capital in the overall Chinese economy in 2013 is gauged with the same two off-the-shelf indicators. China's combined average 2013 overall economic freedom and openness score was 58.45 versus India's 60.9. Private capital in India, therefore, would have greater historical and institutional support against state intervention in their actions according to the criteria adopted for the vulnerability-interaction model.

This comparative study employs the same four-scenario domestic-international-capital-state balance framework. The conclusion is that domestic private capital in China's petroleum sectors was definitely weaker than international capital in absolute terms, but both were much weaker than NOCs within China, even more so than in India. China, like India, fits in scenario three of the domestic-international-capital-state balance analytical framework. State capital in the Chinese petroleum sectors, however, played a much stronger role than international capital did in China's overall economy. The reverse was true in India.[149] This seems to suggest the Chinese state has placed great strategic importance on these sectors or it has a strong aversion of letting foreign companies operate in these sectors. More analysis of the state's orientation, the determinant factor in scenario three of this analytical framework, in the form of trust in the oil markets, is the subject of the next section.

Adding the actor-specific source of private capital strength appears to slightly widen the gap of the overall strength of private capital between China and India. This is especially

[147] For details of the calculation of these scores, see Table A13, Appendix C. It should be noted that this index does not take transit route risks into account, which has been a major concern of China. See Section 3.4.3 below for more discussions. The higher transit route risks for China would narrow the gap of the physical supply risk it had with India, and hence the overall OV between China and them.

[148] If all these components have the same weight.

[149] The five-year (2009-2013) overall net inbound FDI to China accounted for 3.22% of its GPD versus India's 1.80%. This is calculated with the same World Bank data as in the case of India. While no concrete figure is found on FDI in China's petroleum sectors as a percentage of total inbound FDI, it appeared to be smaller than 3% (see discussions in the following sub-section). That figure for India was about 3% of petroleum sectors. See section 2.3.1 above.

true in their respective petroleum sectors, but the difference does not appear to amount to a placing them in differing trichotomous levels.

3.3.1 Strength of Private Capital in Chinese Oil Sectors

As discussed earlier, in the decade leading to 2013, the Chinese upstream oil sector was almost completely dominated by the "three barrels." China did allow IOCs to participate in offshore oil and gas development since the early 1980s, which Chinese NOCs lacked the technology or expertise to pursue on their own.[150] These invitations were later extended to some onshore projects. Since then, for example, "U.S. oil companies have launched dozens of joint ventures with Chinese partners to conduct geological surveys and engage in the refining sector in China."[151] This push for introducing and eventually reproducing advanced foreign energy technologies and equipment in China continued and was codified in energy planning directives for the 12th Five-Year-Plan starting in 2011.[152] Yet, even the provincial-level SOE Yanchang Petroleum and a few IOCs only played a very small part in the upstream sector, and the opportunity for domestic private oil firms to participate "was basically non-existent."[153]

Chinese domestic private oil firms mainly concentrated in the mid- and downstream oil sectors. Even there, they were very weak in the years leading to 2013. The bottleneck for them was where and how to source crude oil to feed their refineries or oil products to fill up their service stations. In 2010, domestic private oil refiners produced 11% of oil products sold in China, a 2% increase over the previous year. The oil products private refiners produced, however, must be sold to either CNPC or Sinopec for wholesale distribution, according to the State Council "Document 38" promulgated in 1999.[154] The state issued a directive calling for the dismantling of installations with production capacity

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[150] Andrews-Speed and Dannreuther, *China, Oil and Global Politics*, 64.

[151] Zha Daojiong, "Energy in Sino-American Relations: Putting Mutual Anxiety in Context," *Strategic Analysis* 31-3: 493.

[152] As mentioned earlier, unconventional hydrocarbon E&P technologies are one of the targets of acquisition. See *National [Chinese] Energy Technology Planning in the 12th Five-Year-Plan (2011-2015)*, 102 [国家能源科技"十二五"规划（2011-2015]. National Energy Administration website, accessed 12 December 2016. http://www.nea.gov.cn/131398352_11n.pdf. Also see *State Council Circular on Issuance of Energy Development Planning During the 12th Five-Year-Plan*, Section 9.2, Chapter Three [国务院关于印发能源发展"十二五"规划的通知]. The Central People's Government of the People's Republic of China website, accessed 12 December 2016. http://www.gov.cn/zwgk/2013-01/23/content_2318554.htm.

[153] Zhizhuan Li, "Development Situation and Prospect of Chinese Private Oil Enterprises," *International Petroleum Economics* 2012-4, 59. [李志传, 中国民营石油企业发展状况和前景展望，《国际石油经济》2012.4]

[154] Ibid, 57. CNOOC traditionally concentrated on offshore oil E&P only, but it began to participate in oil refining, product distribution, and setting up its own service stations in the few years leading to 2013. Another company that also began to engage in these activities in the same period was Sinochem, a central-level SOE which traditionally only engaged in oil trading. Ibid。 Also see "Energy Business," Sinochem website. Accessed 1 December 2016, http://www.sinochem.com/en/1437.html .

under two million tons per year by 2013. As of the end of 2010, over 80% of local refineries were under this capacity. At the end, only seven such refiners met the criterion and continued to operate.[155] Domestic private firms also tried to engage in oil product distribution. Of the over 2,500 sizable oil product wholesaling firms in China in 2012, however, CNPC and Sinopec owned over 1,600 of them, and other SOEs owned three hundred. Only six hundred were domestic private firms.[156]

Private capital, both domestic and international, was the most active in the Chinese downstream oil sector. As of 2010, there were a total of 95,740 service stations in China, a little less than 19% belonged to CNPC and a little over 31% to Sinopec. Other SOEs and foreign companies owned more than 2,000, which was about three percent. The remaining 47% or about 45,000 of service stations were owned by domestic private firms.[157] BP, ExxonMobil, and Shell were the three major IOCs that entered the Chinese oil products retail market and set up service stations recently in China.[158] These numbers, however, belie the fact that NOCs, especially CNOC and Sinopec, still covered 85% of the volume of oil product sales in all service stations, while domestic private oil firms covered only about 10% during the period under reviewed.[159]

It was very difficult for domestic private oil companies to compete with NOCs and other SOEs engaging in oil supply not only because of laws and regulations that favoured the latter. Domestic private oil firms were also much smaller in size and lacked capital and other technical attributes. Enterprises, for example, were only qualified to apply for the license to sell crude oil in China with a minimum registered capital of RMB100 million or almost US$16 million. No domestic private oil company was qualified as of 2012.[160] Domestic private oil companies formed a couple of trade groups over the years to try to lobby for their interests, such as the repeal of State Council directive that greatly reduced the operating space of small, private oil sector enterprises ("Document 38"). The more representative of these was the China Chamber of Commerce for Petroleum Industry established in 2004.[161] According to an analyst at the CNOOC Energy Economics Research Institute, however, these groups were ineffective and unstable because the interests of their

[155] Ibid., 60.
[156] Ibid, 58.
[157] Li, "Development Situation and Prospect of Chinese Private Oil Enterprises," 58.
[158] Ibid., 59.
[159] Ibid.
[160] Ibid., 58. The US dollar equivalent amount is calculated with the 1 January 2013 historical exchange rate. See Oanda website, accessed 13 December 2016, https://www.oanda.com/currency/converter/.
[161] Li, "Development Situation and Prospect of Chinese Private Oil Enterprises," 60. Also see the website of China Chamber of Commerce for Petroleum Industry for a brief history of the group (in Chinese). Accessed 13 December 2016, http://www.cccpi.org/first/firstAction_showShanghuiErJi?kid=14ec1d04-efb6-41d5-93c0-d54d28c13350.

members did not line up.[162] Another reason appears to be the tremendous legal, as well as political obstacles they must overcome to further their interests.[163]

The analysis in the previous paragraphs indicates that domestic private capital was weaker than both international capital and NOCs in the Chinese oil sectors in absolute terms as of 2013. It is not easy to gauge the relative strength of domestic capital and international capital within China. Neither had much room to operate under the legal and de facto monopoly of the "three barrels" as well as competition from other SOEs. As of 2013, private capital as a whole was nowhere near parity in strength with national-level NOCs within China. Yet, they carved out niches according to their different characteristics. With much larger capital bases and technical expertise, IOCs have been comparatively more active in the upstream sector than domestic private firms. Domestic companies survived in the mid- and downstream sectors with their historical and local connections.[164]

It is also not easy to compare the strengths of Chinese NOCs with those of IOCs in absolute terms. The "three barrels" are not publicly-listed and therefore do not need to provide transparent and accurate accounting information. Their publicly-listed subsidiaries are quite large by global standards, even if they still lagged behind the biggest IOCs.[165] In any event, due to various forms of entry barriers and historical factors as discussed earlier, within China, Chinese NOCs were without a doubt much stronger than IOCs. The actor-specific source of the domestic-international-capital-state balance in China in the years leading to 2013, therefore, fits in the third scenario or the bottom right quadrant of the framework, the same as India.

3.4 China and India's Overall Trust in Oil Markets

This section examines each component that is hypothesised to make up China's overall trust level in oil markets' ability to ensure oil supply security in greater detail. The goal is to verify if China and India deserve to receive the same trichotomous overall trust level as in the preliminary study. Similar content analyses of NOC annual reports and more detailed data related to Chinese NOCs as securitising agents as well as to the pertinence of

[162] Zhizhuan Li, "Development Situation and Prospect of Chinese Private Oil Enterprises," 60.
[163] It is telling that the first "goal" listed in the "Introduction" of the organization's website is to "adhere to the Party line, principles, and policies." The second was "Educate members to love the nation, respect their industry, and be law-abiding." "Actively protecting the legal rights of members" is only listed third.
[164] Many of them were established in the early days of the petroleum sector reform when rules were more lax and contributed greatly to the local economy through payment of taxation and creation of employment opportunities.
[165] By the measure of stock market capitalization alone, PetroChina, (subsidiary of CNPC), was ranked the 2nd in 2012 and the 4th in 2013 on the IHS Energy 50, which the world top 50 energy firms. Sinopec Corp., subsidiary of Sinopec Group was ranked the 11th in 2012 and 10th in 2013; and CNOOC Ltd., subsidiary of CNOOC Group, was ranked 10th in 2012 and 13th in 2013. "IHS Energy 50 – The Definitive Annual Ranking of the World's Largest Listed Energy Firms, January 2014."

the domestic and external securitization contexts serve as the basis of understanding the country's overall trust level around 2013.

The conclusion is that while China and India both had a low overall level of trust in the oil markets, Chinese NOCs appeared to less enthusiastic securitising agents than their Indian counterparts. The external context that is hypothesised to be critical to impacting the overall trust level, however, was more salient to China and hence more than made up for Chinese NOCs "slack" relative to securitisng. Indeed, the salience of the external context appeared to engender another group of more enthusiastic securitising agents.

3.4.1 Securitising Agents

Both China and India receive the lowest trichotomous score for the securitising agent component in the preliminary analysis in Chapter Three, which is hypothesised to lead to the lowest level of trust in oil markets. This is based on the fact that the two economies each have at least one traditional NOC. In this sub-section, the coherence of Chinese NOCs as securitising or lobbying agents and evidence of their securitising attempts are examined to compare with those by Indian NOCs. The same procedures and terms or their Chinese equivalents as detailed in Section 2.4.1 above are used to conduct analysis.

Like India, China had a number of NOCs, but they had mostly been vertically integrated in the years leading to 2013. A content analysis of the annual reports of the "three barrels" and their subsidiaries from 2009 to 2013 is presented here to look for evidence that they routinely play up their importance in ensuring the oil supply to and distribution within the economy.

Chinese NOCs and their subsidiaries only engaged in slight to moderate securitising by analysing the contents of their annual reports alone. The five-year average of the overall securitising score of the subsidiaries was 4.07, only about 11% that of Indian NOCs' overall score of the same period.[166] The subsidiaries of "the three barrels" were large multinational corporations listed in international stock exchanges, even if they were still majority-owned and tightly controlled by their parent NOCs.[167] It is, therefore, unsurprising that they would tone down any securitising effort in their annual reports. The two-year average overall score

[166] India's ONGC and IOCL together receive a five-year average overall score of 37.2. The 2009 – 2013 English language annual reports of PetroChina, Sinopec Corp., and CNOOC Ltd. were analysed to get this overall score. A comparison of the Chinese and English language of the pertinent annual reports shows that they are fairly accurate translated versions of each other and so only the English language ones were analysed.

[167] As of 2013, CNPC owned 86.5% of PetroChina; Sinopec Group owned 73.96% of Sinopec Corp.; and CNOOC Group owned 64.566% of CNOOC Ltd. See pages 15, 16, and 57 of these three companies' 2013 annual reports respectively. Shares of PetroChina were initially offered to the public in May 2000; those of Sinopec Corp. in October 2000; and those of the CNOOC Ltd. in February 2001, all in the New York and Hong Kong stock exchanges. See Kong, *China's International Petroleum Policy*, 168. Publicly listed Indian NOCs are only listed in the domestic stock exchange in Mumbai.

of the actual "three barrels," was considerably higher at 14.[168] After all, the Chinese public and central-level decision-makers, the target audience of any securitising effort, are unlikely to read the English language annual reports of these companies. Still, even this score was only 37.41% that of India's. On the surface, this shows that Chinese NOCs were much less forceful or coherent securitising agents.

This interpretation of these results should be checked against the background of the near upstream and midstream monopoly enjoyed by Chinese NOCs in the decade prior to 2013. The need for Chinese NOCs to lobby for their continued existence was smaller as there was not much real competition. As detailed in the last section, there were more stringent legal barriers for private firms to enter China's various petroleum sectors. Besides, in the decade leading to 2013, the state had internalised the idea originated by CNPC that NOC overseas expansion was needed to ensure China's oil supply security.[169] The Chinese state has since acted as a robust resource supplier and a weak veto player for Chinese NOC internationalization as Meckling *et al* and others have pointed out.[170] Under such circumstances, Chinese NOCs also did not have much need for powerful lobbying of their expansion. Unless there are radical structural or institutional changes that meaningfully reduce the overwhelming dominance of NOCs in China, therefore, these companies would not need to put too much energy in securitising or lobbying, at least not through the public means of what they say in their annual reports.

In any event, Chinese NOCs did engage in some securitising with the contents of their annual reports.[171] In line with the reasoning that the more secure a company is relative to its dominance, the less the need to securitise or lobby for its activities, the two-year average scores of the "three barrels" matched their dominance in the upstream oil sector in China. CNPC, which produced over 31% of the oil consumed in China in 2013, scored only 4.[172] CNOOC Group, which produced about 13% of oil consumed, scored 15.5.[173] The weakest

[168] These are the 2012 and 2011 annual reports of CNPC and the 2013 and 2012 annual reports of Sinopec Group and CNOOC Group. The current website of CNPC only provides annual reports of itself for years 2014, 2015, and 2001. All the other annual reports provided are those of PetroChina (in Chinese). Accessed 12 December 2016, http://www.cnpc.com.cn/cnpc/ndbg/gywm_list.shtml. The 2012 and 2011 annual reports of CNPC were obtained from the company's website in 2014.
[169] According to Kong, the idea was initiated by CNPC in 1991, but was only fully embraced by top level political leaders in the late 1990s when oil import to China increased exponentially. See *China's International Petroleum Policy*, 37-46.
[170] Andrews-Speed and Dannreuther go one step further to say that from the earliest days, the state actually played "a key role" in these NOCs' internationalization. See *China, Oil and Global Politics*, 83-85.
[171] This is in comparison to the zero three-year overall score of ExxonMobil got during the same period.
[172] The 31.5% is calculated with the consumption data in the BP Review 2014 and the production figures in the *CNPC 2013 Annual Report* (in English), p6.
[173] The 13.17% is calculated also with the BP 2014 Review and the *CNOOC Group 2013 Annual Report* (in English), p6.

of the three, Sinopec, scored 22.5.[174] CNPC scored very low for the terms that are used to detect the general securitising agent role of NOCs compared to the other two companies. For the two years of its annual reports analysed, the term "energy security" was only mentioned once.[175]

By contrast, CNOOC and Sinopec used the general securitising agent terms of "strategic" and "security" in a pertinent way more frequently.[176] Some interesting examples specially related to the offshore hydrocarbon E&P niche of CNOOC read: "The 18th National Congress of the Communist Party of China has made the strategic deployment of building [China] into a maritime power. This has provided a new opportunity for elevating the development of a maritime economy as a national strategy, and for the major development of the offshore oil industry";[177] and "We must actively undertake this mission…to raise our ocean resource development capability to ensure the nation's energy security…and to make requisite contribution to building a 'beautiful China' and a 'maritime power'."[178]

3.4.2 Chinese Domestic Context

China, like Thailand, was more "wealthy" and urbanised than India as of 2013. By these two measures, therefore, the objective domestic context should allow decision-makers in China to have fewer worries about trusting an unfettered domestic market or relying solely on private oil firms to ensure oil supply security. China, however, had a noticeably less even income distribution among its citizens than India.[179] As in the case between Thailand and India, adding the factor of the evenness of income distribution actually narrows the gap in decision-makers' trust in the domestic market in the two economies than the results in the preliminary study suggest.

In addition, a survey on how differing cultures affect the public perceptions of energy security shows that respondents from developing countries including China and India

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[174] Sinopec Group produced less than 9% of the crude oil consumed in China in 2013. Its production figure is obtained from page 6 of its 2013 English annual report. The rest of the crude China consumed were produced by the subsidiaries of the three barrels, as well as imported and produced by other SOEs.

[175] It was used in the sentence "[the company] has made new contribution to ensuring the nation's energy security and to promoting the continued healthy development of the national economy." CNPC 2012 Annual Report (in Chinese), 3.

[176] As a reminder, when these terms are used in contexts irrelevant to securitising or lobbying, such as "social security" or "strategic committee," they receive the score of zero in the analysis.

[177] *CNOOC 2012 Annual Report* (in Chinese), 5.

[178] Ibid., 4.

[179] Again, the only GINI index data for India from the World Bank was for 2011 and the reading was 35.2. See footnote 81 above. In the period studied, data are only available for China in 2008 and 2012. The two very similar readings are average to obtain the reading of 42.5, which was also considerably higher than Thailand's five-year average reading of 38.74. See "GINI index (World Bank estimate) – China," the World Bank website. Accessed 15 December 2016, http://data.worldbank.org/indicator/SI.POV.GINI?end=2012&locations=CN&start=2008.

"did rate affordability and equitable access to energy services to be of higher importance than respondents" from advanced economies.[180] In fact, the results show that Chinese respondents, over half of whom had postgraduate education, rated these aspects of energy security slightly higher than Indian respondents.[181] These results support the propositions of the vulnerability-interaction model that different cultures would have an impact on the risk preference and belief formation of decision-makers and affordable and equitable access is a relevant domestic context for securitising.

A content analysis of terms pertinent to securitising the domestic oil supply context in the annual reports of Chinese NOCs shows that their efforts lagged even further behind those of Indian NOCs.[182] English language annual reports of NOC subsidiaries hardly mentioned serving the oil supply needs of poor or remote rural communities at all. Poverty alleviation projects in remote counties were only mentioned twice in CNOOC Ltd.'s annual reports. The Chinese language annual reports of the parent companies on the whole fare little better. Again, the same inverse relationship between securitising effort and NOC dominance in the upstream oil sector is observed. In this case, CNPC annual reports did not contain words pertinent to serving the community or even poverty alleviation effort at all in the two years analysed in this project.

One possible reason for Chinese NOCs' lackadaisical attitude is that many oil product retail outlets in low sales volume rural and poor areas might be operated by domestic private firms with local connection, not by the "three barrels." As mentioned in Section 3.3.1 above, almost half of all oil product retail outlets in China were operated by domestic private firms, but these outlets only covered about 10% of the sales volume of the retail market. Besides, in the decade leading to 2013, the oil product pricing mechanism in China, although not totally liberalised, was linked to international oil prices in a delayed manner.[183] On the

[180] Benjamin K. Sovacool, "Differing cultures of energy security: An international comparison of public perceptions," *Renewable and Sustainable Energy Reviews* 55 (2016), 819. Apart from China and India, two other case-study economies from the preliminary study of this thesis, Japan and Singapore, are also in this survey. They are grouped under "the advanced economies."

[181] For the demographic information of Chinese respondents, see ibid., 813. For the ratings given by Chinese and Indian respondents, see ibid., figure 4, 819. According to the reasoning of the proposed model, respondents of lower socio-economic level may rate these aspects even higher.

[182] The five-year average domestic context score of English language subsidiary annual reports is 0.13 and the two-year average of this score of Chinese language parent company annual reports is 7. The five-year average of Indian NOC domestic context score is 27. This means that even the higher of the Chinese score is not much more than a quarter of India's score.

[183] Zhang and Xie, "China's oil product pricing mechanism" *China Economic Review* 38 (2016): 210-211. In particular, Figure 1 on page 211 shows the difference between the international oil price with the domestic oil price between January 2000 and June 2013. There have been a number of changes over basically the same system since it was instituted in 1998. They included the products or crude oil prices used as benchmarks, and the magnitude of international oil price fluctuations and length of time lag of the fluctuation stipulated before domestic oil product prices may be adjusted. In March 2013, the most recent change shortened the adjustment period to every 10 working days (from the

surface, this pricing mechanism should not deter private firms from serving the poor population as much as the artificially low oil product pricing, especially in diesel and kerosene, in India would. Chinese NOCs securitising their function of serving the underprivileged, therefore, would sound disingenuous.

An interesting observation is that Chinese NOCs took a much more realistic attitude toward the idea of self-sufficiency or self-reliance than Indian or Thai NOCs. These terms did not show up in any of the 21 Chinese NOC annual reports analysed, regardless of their language or company. China crossed the line to become a net oil importing country in 1993. Chinese NOCs have been pragmatic about this situation and have assigned emphasis on overseas expansion to acquire the resources instead.[184] This in turn may be due to the fact that they had greater material capability to do so.

In sum, the domestic economic and cultural contexts that would provide the opportunity for NOCs to securitise the role they played in the oil supply within their respective economies did not differ too much in China and India in the period studied. This is especially true when the additional evidence presented in this sub-section is taken into consideration. The survey cited earlier seems to confirm the similar level of importance the public in the two countries placed on equitable access of affordable energy. This likely engenders similar risk preferences among the two countries' policymakers in entrusting the oil supply within their respective economies to totally free markets without any form of state intervention.

Two of the three major Chinese NOCs did highlight their roles in poverty alleviation, but not oil supply activities in remote rural areas in the two years of their annual reports analysed in this project. In representing their efforts, however, they were much less enthusiastic than Indian NOCs. Yet analysing Chinese NOC annual reports may not be a reliable way to understand the true extent of their securitising efforts.

The stringent entry barriers to the Chinese petroleum sectors and their only partially deregulated oil product pricing regime (despite three decades of sectorial reforms) seem to be indicative of the government's limited trust in an unfettered domestic oil market. According to Chen Shaofeng, Associate Professor at the Peking University who specialises in reviewing these sectors, the Chinese state tried to introduce competition among NOCs and elements of the market mechanism to improve the efficiency of the Chinese petroleum sectors, and hence the economy's oil supply security. At the same time, it tried to retain

previous 22 working days with a 4% "floating band"). See "China adjusts oil price mechanism," 26 March 2013. China.org. website. Accessed 20 December 2016, http://www.china.org.cn/business/2013-03/26/content_28365275.htm.

[184] Terms like "resource strategy" [资源战略] appear in NOC annual reports to mean employing all kinds of methods to deepen the resource bases of the companies, both domestically and more often, used in the same breath as internationalization or overseas development.

control of the "marketisation process" because of "concerns about the possible destructive effects on national security, socio-political stability and economic development resulting from disruptions of the oil and gas supply and price fluctuations."[185]

3.4.3 External Securitising Context of China

China is the only case-study economy in the plausibility probe that receives the lowest trichotomous score for its relationship with the United States. This denotes a relatively negative, or what the vulnerability-interaction model labels a "neutral-conflictual" relationship between the two countries in the years leading to 2013. Objectively, such a state of affairs should not have any bearing on the effectiveness of the oil supply function of international oil markets. As reiterated in the paired comparison between India and Thailand, interested parties in net oil importing countries with such as a relationship with the United States can easily exploit the situation to securitise the untrustworthiness of the international oil markets. A major way to do so is by propagating the aggressive zero-sum strand of economic nationalism, which would be less convincing in countries having a positive relationship with the United States, which has generally been a promoter of free trade since the end of World War II.[186]

This sub-section examines Chinese-U.S. relationship more closely to verify if it deserves that lowest trichotomous score and if their relationship did result in China having a lower level of trust in the international oil markets than India. In this project, only countries that are formal or de facto defence allies of the United States receive the highest external context score. This is not applicable to either China or India. This paired comparison, therefore, only needs to examine whether China's relationship with the United States is of a similar or a lower quality than the Indian-U.S. relationship in the decade leading to 2013.

There have been a plethora of academic studies and punditries on China-U.S. relationship, ranging from very pessimistic or conflict-deterministic[187] to more nuanced and

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[185] "State-Managed Marketization: The Role of the Chinese State in the Petroleum Industry," *The Copenhagen Journal of Asian Studies* 30-2 (2012): 35.

[186] The first-order effect of this reasoning would facilitate securitization of the untrustworthiness of the international oil markets in China since the United States has long been the hegemonic power and dominant (international oil) market player. Once this securitization began and caused China to adopt more strategic oil supply measures, however, the situation may be exploited by interested parties in the United States to securitise any oil supply activities adopted by Chinese NOCs, seen as agents of the Chinese state. Increased levels of securitization of oil supply on both sides, therefore, can easily spiral into a vicious cycle of mutual distrust and a higher level of strategic oil supply measures adopted by both countries, not unlike the dynamics described by the security dilemma theory. Whether this downward spiral actually materialises would hinge on the confluence of confirming (and enabling) and disconfirming (and disabling) factors at the time.

[187] Selected examples of studies that can be characterised as such include John Mearsheimer, *The Tragedy of Great Powers* (New York: W.W. Norton, 2001), Aaron L. Friedberg, "The Future of U.S.-China Relations: Is Conflict Inevitable?" International Security 30-2 (Fall 2005): 7-45.

balanced[188] to anywhere in between. David Shambaugh, one of the foremost American Sinologists, coined the term "coopetition" to describe the "competitive coexistence" between China and the United States in the period studied.[189] Despite the deeply interdependent nature of this relationship and some areas of cooperation between the two countries,[190] Shambaugh summarises the prognoses of many observers this way:[191]

> …the U.S.-China relationship has increasingly tended towards competition in recent years. This is plainly evident in the economic, ideological, normative, security, and geopolitical realms. *Divergence* rather than *convergence* of interests [emphases original], approaches, and policies increasingly characterize the relationship…institutionalized efforts [to pursue cooperation and coordination] are increasingly ephemeral and episodic, while the deeper competitive forces threaten to overwhelm the efforts for cooperation…The sphere of cooperation seems to be shrinking while the zone of competition is expanding.

Even observers with more sanguine views of the state of the China-U.S. relationship have no difficulties coming up with conflictual Sino-American national interests.[192] Furthermore, upon closer inspection, some of the more "optimistic" views of China-U.S. relationship can hardly be classified as even" neutral" by most standards. Charles Glaser, for example, asserts that "China's rise need not be nearly as competitive and dangerous as the standard realist argument suggests."[193] Yet, the sources of his "optimism" are mutually assured destruction provided by nuclear weapons, to be extended to Japan and

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[188] An example of this category of studies is Rosemary Foot, "Chinese strategies in a US-hegemonic global order: accommodating and hedging," International Affairs 82-1 (2006): 77-94; and

[189] "Tangled Titans – Conceptualizing the U.S.-China Relationship," in Tangled Titans, edited by David Shambaugh, Rowman & Littlefield Publishers, 2012. ProQuest Ebook Central, http://ebookcentral.proquest.com.virtual.anu.edu.au/lib/anu/detail.action?docID=1046296.

[190] Examples of their interdependence include: "They were each other's second largest trading partners, the U.S. is the largest source of foreign direct investment in China, while China is the largest foreign creditor of the United States." Ibid. Examples of cooperation include climate talks, anti-terrorism during Beijing Olympics, and nuclear non-proliferation towards North Korea. See Shirley A. Kan "U.S.-China Counterterrorism Cooperation: Issues for U.S. Policy," *Congressional Research Service, July 15, 2010*, 21-22; and nuclear non-proliferation effort over the Korean Peninsula, backing UN plan for stability in Sudan in 2006 and initiating naval anti-pirate operations off the Coast of Somalia in 2008. See Thomas J. Christensen, "The Advantages of an Assertive China: Responding to Beijing's Abrasive Diplomacy," *Foreign Affairs*, 90-2 (March/April 2011):56.

[191] Tangled Titans.

[192] For example, while questioning numerous premises of Yan Xuetong's "superficial friendship theory" which explains the "unstable China-U.S. relationship," Alastair Iain Johnston points out China's naval development to "prevent/deter the USA from monopolizing Sea Lines of Communication" and "China's efforts to promote certain Confucian values versus US liberalism" as may be put on the list of the two countries conflictual interests. At the same time, Johnston, like many other observers, points out many "common and complementary interests" or cooperative efforts between the two. See "Stability and Instability in Sino-US Relations: A Response to Yan Xuetong's Superficial Friendship Theory" *The Chinese Journal of International Politics*, Vol. 4 (2011): 5-29.

[193] "Will China's Rise Lead to War? Why Realism Does Not Mean Pessimism," *Foreign Affairs* 90-2 (March/April 2011): 80-91 - 81

South Korea, a reduced U.S. commitment to the "less-than-vital interest" of Taiwan, and the "separation by the Pacific Ocean."[194]

The above analysis shows that China-U.S. relations were at a lower quality than that between India and the United States of the same period. If India's "strategic autonomy" prevents it from being a close friend of the United States,[195] "strategic distrust" seems to be at the heart of the fraught relationship between China and the United States.[196] A report on the subject by an American think-tank identified the three fundamental sources of this distrust as "different political traditions, value systems and cultures; insufficient comprehension and appreciation of each others' policymaking processes… and a perception of a narrowing gap in power between the United States and China."[197]

There are parallels between how this distrust developed suggested in that report and how a negative relationship with the United States can be securitised to undermine China's trust in the fairness or reliability of the existing international oil markets. First, the report says "various sources indicate that the Chinese side thinks in terms of a long-term zero-sum game."[198] If this is true, that means Chinese decision-makers are already "primed" to be securitised about the untrustworthiness of major international oil exchanges by the way suggested by the vulnerability-interaction model. The biggest oil exchanges in the world have been owned and operated by American firms. These exchanges may be seen as part of economic nationalistic scheme to perpetuate U.S. economic and political pre-eminence in the world.[199]

If it is not true that China elites by and large think in zero-sum terms, it seems to suggest American elites project mercantilist intentions onto "the other" partly due to different value and cultural systems. In fact, the report goes on to say that "economically, the United States worries that China's mercantilist policies will harm the chances of American economic recovery."[200] One way or the other, the situation seems to fit in the oil supply securitisation spiral suggested earlier. It is exactly this kind of zero-sum logic that is behind what is listed as one of China's "challenges" to ensure hydrocarbon supply security in an article attributed to the CNPC Economics and Technology Research Institute:[201]

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[194] Ibid., 91.
[195] See footnote 95. Madan, "The U.S.-India Relationship and China."
[196] Kenneth Lieberthal and Wang Jisi declare in a report on the subject, "The issue of mutual distrust of long-term intentions – termed here 'strategic distrust' – has become a central concern in US-China relations." See *Addressing U.S.-China Strategic Distrust* (Washington D.C.: John L. Thornton China Center Brookings, 2012), vi.
[197] Ibid., xi.
[198] Ibid. ix.
[199] See footnote 74 in Chapter Three.
[200] Ibid., ix.
[201] "An analysis and reflection on China's oil security," in *China's Energy Security: Current Situations and Strategic Choices*, ed. By Fan Gang and Ma Weihua (Beijing: China Economic

> The increasing energy independence of the United States helps to increase the space and flexibility of its global policy manoeuvring…so that the geopolitical role of the energy "weapon" can be given greater play. This [independence] can also provide it with a greater array of strategic tools. By influencing the energy situations in the Middle East and Africa, it can restrain the dominant position of the OPEC in the world petroleum markets, as well as greatly intimidate large hydrocarbon importing countries like China, thus strengthening its control of the energy security of the world.

Second, the same report on strategic distrust says "China also views the U.S. as taking advantage of the dollar as a reserve currency and adopting various protectionist measures to disadvantage the PRC economically."[202] Again, this sentiment seemed to make decision-makers receptive of the securitisation about the "unfair advantage" to the United States of the dollar-denominated trading in the existing international oil markets. Regardless if it was the result of securitisation by interested parties in China, its unhappiness of this "advantage" was among the reasons prompted its quest to establish China's own international energy exchange with trading denominated in yuan.[203]

In fact, one of the measures to enhance oil supply security suggested in the same article attributed to the CNPC Economics and Technology Research Institute calls for the establishment of a crude oil futures market and a nationwide oil spot market in China as soon as possible "to set benchmark prices for the region and even the whole world to increase China's control over pricing.[204] Intriguingly, however, an article from the same edited volume authored by Chen Weidong, Chief Energy Researcher of the CNOOC Energy Economics Institute, projects a very pro-market posture. He enthusiastically advocates Chinese NOCs, private firms, and sovereign fund to participate in oil futures trading as it "dominates modern international oil trading." [205] He also says, "a great power's responsibility is not to 'get the drums rolling to set up a new shop' but to actively participate, make accomplishments, create harmony, and make developments together."[206]

This divergence of views may be explained by what individual NOCs decided (as of 2012) to be the most effective way to engage in securitisation or desecuritisation to further

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Publishing House, 2012), 64. [对我国 石油安全问题 的 分析与思考 – 中石油 经济技术研究 在范纲，马蔚华主编 中国能源安全现状与战略选择]

[202] Ibid., viii.

[203] Andrew Critchlow, "China's new oil contract signals shift from Brent and US dollar," The Telegraph, 7 September 2015. Accessed 20 October 2015, http://www.telegraph.co.uk/finance/newsbysector/energy/oilandgas/11848172/Chinas-new-oil-contract-signals-shift-from-Brent-and-US-dollar.html.

[204] "An analysis and reflection on China's oil security," 66.

[205] "China's oil industry—only reforms and innovation promise a future," in China's Energy Security: Current Situations and Strategic Choices, ed. Fan Gang Fan and Ma Weihua, 134. [陈 卫东， 中国石油工业 – 唯改革唯创新才有未来]

[206] Page 134

their interests. As explained in Chapter Two, many NOCs in net oil importing countries, especially the ones with some form of oil price control in their home countries, have been participants in, and at some point also beneficiaries of trading in the existing international oil markets. Chinese NOCs and their publicly-listed subsidiaries were no exceptions. In fact, they reportedly have been relatively adroit and aggressive traders in recent years.[207] The analysis earlier in this chapter intimates that the de facto monopoly the "three barrels" enjoyed in the Chinese upstream sector was the key to their dominance. In view of the Chinese government's recent move to relax unconventional hydrocarbon E&P in China by private firms, desecuritising the importance of that sector would be a worthy attempt by NOCs. Sure enough, Chen claims that "focusing on upstream makes little sense…Although increased investment could still boost production, it is not a reasonable option in today's market economy…opening the upstream will not bring fundamental changes to the Chinese oil industry."[208]

That China was dependent on oil that had to be shipped through sea lanes only the United States had naval capability to block and the relatively negative relationship between the two countries have made this topic much securitised.[209] Top-level Chinese leaders already saw these two facts as combining to pose a grave threat to China's energy security as early as 2003.[210] In the following decade, various interested parties continued to make

[207] Especially compared to Japanese traders. Interview with John van Schaik, New York Bureau Chief, *Energy Intelligence*, New York City, 15 June 2015. In fact, oil trading companies of Chinese NOCs or their subsidiaries, seem to have become price-makers in the Asian physical crude oil trading market due to the large volume of their trade since the second half of 2014. See Florence Tan and Henning Gloystein, "China strengthens hold over oil market as price-maker," Reuters website 11 August 2015. Accessed 2 February 2016, http://www.reuters.com/article/china-oil-trading-idUSL5N10H2GF20150811.

[208] "China's Oil Industry Enters a New Era With the Trend of Energy Transitions," *NBR Brief for the Pacific Energy Summit June 2016*, 2.

[209] There are isolated Chinese analysts, such as Zhao Hongtu of the think-tank China Institute of Contemporary International Relations, who points out such concerns were overblown. Another one is Zha Daojiong. On this subject, he said "there has not been a single known major incident of deliberate interruption since the early 1990s, making such issues primarily psychological." See Jonathan D. Pollack, "Energy Insecurity with Chinese and American Characteristics: implications for Sino-American relations," *Journal of Contemporary China* 17-55 (2008): 234-236.

[210] Then Chinese President Hu Jintao reportedly coined the term the "Malacca Dilemma" to describe what the central leadership saw as both an energy and an economic security issue in a Chinese Communist Party economic work conference in November 2003. His speech was clear to implicate the United States as a major source of the threat: "…certain powers have all along encroached on and tried to control navigation through the strait." See Marc Lanteigne, "China's Maritime Security and the 'Malacca Dilemma'," *Asian Security* 4-2 (2008): 144. Kong discussed the "wake-up call from the 9/11 terrorism attack and the U.S. invasion of Iraq" as the events that "catalyzed the formation of China's international petroleum policy" while "three groups of agents" within China brought the awareness of the country's petroleum security challenges to the central leaders. These three groups include the "policy-making community" such as the three barrels and the various ministries and central level academies (think tanks), the academic community, and the mass media. It is very plausible that some securitization took place along the way. See *China's International Petroleum Policy*, 48-56.

use of this external context to highlight the fact that relying on international markets alone cannot ensure China's oil supply security.

In the 2012 CNPC Economics Research Institute article quoted above, two of the measures to increase oil supply security discussed are related to this external context. One is to develop new "strategic passageways" to correct China's "over-dependence" on oil from the Middle East that has to pass through "the Strait of Malacca and the Strait of Hormuz."[211] China's "One Belt, One Road" initiative to improve both overland and maritime connectivity between China and the rest of Eurasia makes perfect sense viewed in this light. Two is to strengthen "military planning on energy security" such as "the defence capability along energy shipping routes."[212] The underlying message is that with all these geostrategic complications, NOCs, unlike private firms, can be relied on to take China's national security interests into account even when pursuing but also "foregoing maximum" profits in their overseas oil projects if needed.[213]

The strong military and geostrategic implications of this external context resulted in many in the "policy-making community" other than NOCs to engage in its securitisation. Liu Xuecheng of the Ministry of Foreign Affairs think tank, China Institute of International Studies, for example, said in 2006:[214]

> [F]rom China's perspective, domestic energy strategy is rooted in the vulnerability of its access to external energy resources and defensiveness against the United States curtailing its energy supplies. Considering the [potential] vulnerability of the four-fifths of all Chinese imports that pass through the Strait of Malacca, China sees its maritime shipping security as a pressing priority.

The defence establishments, especially the navy in this case, are natural securitising agents regarding this particular external context. Jonathan D. Pollack documented Chinese naval officers' writings advocating "heightened development of maritime capabilities to ensure long-term power and prosperity of the state" in the early to mid-2000s.[215] This kind of securitising continues to the present day. In an appearance on the China Central Television in June 2016, Rear Admiral Yin Zhuo [尹卓], Director of the PLA Naval Informatization Expert Consultation Committee, opined that the reason behind the

[211] "An analysis and reflection on China's oil security," 66.
[212] Ibid., 67.
[213] This idea was expressed by a confidential interviewee working in one of the three barrels in Beijing in May 2015. Both this and another confidential interviewee working in an NOC, however, stressed that profits or economic considerations have been a major, if not the greatest, concern of NOC operation. NOC's active participation in and indeed benefiting from the international markets does not mean that they did not also engage in selective securitising or powerful lobbying at the same time.
[214] As quoted in Pollack, "Energy Insecurity with Chinese and American Characteristics," 234.
[215] "Energy Insecurity with Chinese and American Characteristics," 235. See especially footnote 25 for all the pertinent articles.

United States deploying littoral combat ships in Singapore was to control the Malacca Strait and possibly block it because the "Malacca Strait is the lifeline of petroleum shipping, foreign trade, and economic development of China."[216]

China's relatively negative relationship with the United States apparently was securitised successfully by proponents of this approach to prompt top Chinese leaders to support Chinese NOCs' overseas expansion and other oil diplomacy effort since the early 2000s.[217] These strategic oil supply measures appear to be evidence that the Chinese state was risk averse and lacked trust in the long-term reliability of the international oil markets. Not only did India had a better relationship with the United State during the same decade, geography also relieves it of any "Malacca Dilemma," if not concerns about shipping security through the Strait of Hormuz or the pirate-ridden coast off Somalia. China, therefore, deserves the lower external context trust score it receives in the preliminary study. In fact, it is argued here that China's reaction to this external context seemed so extreme that its overall trust level in the oil markets deserves to remain in the lowest trichotomous level (and numerically lower than India's as in the preliminary study) even though Chinese NOCs' displayed less rigorous public securitising effort than Indian NOCs.

3.4 Implementation Capabilities of China

China had a considerably higher overall capability to implement strategic oil supply measures than India in the years leading to 2013 according to preliminary analysis. Similar to the method used in the comparison of India and Thailand, the profitability of Chinese NOC and China's oil diplomacy capability are examined in this section as additional measures of its overall implementation capability. As the following analysis shows, the conclusion is that China's capability to implement strategic oil supply measures deserves to be a trichotomous level higher than that of India's.

3.4.1 Chinese NOC Profitability

The "three barrels" and other minor NOCs operating in China were not publicly traded, unlike in India and Thailand. Still, their profitability was an appropriate additional measure of their financial capabilities independent of that of the Chinese state. The "three barrels'" subsidiaries had been traded in major international stock exchanges for more than

[216] Huang Zijuan, "Expert: U.S. Littoral Combat Ships Are of Lower Rank than 054A Frigates," People's Daily website, 28 June 2016, reposted on Chinese military press website. [黄子娟, 专家：美濒海战斗舰战力比 054A 护卫舰差个档次]
Accessed 27 December 2016, http://military.china.com.cn/2016-06/28/content_38762557.htm?f=pad. The rank, current title, and biography of the "expert" Yin Zhuo can be found on the same official Chinese military press website. Accessed 27 December 2016, http://military.people.com.cn/GB/8221/51756/185195/.

[217] See footnote 221.

a decade prior to 2013. Their profitability greatly impacted that of their parent companies which held the majority shares. More importantly, the state had given its NOCs great operational autonomy throughout the country's petroleum sector reforms over the last three decades. Even if China's government were to decide to scale back the robust resource supplier role it had been playing either by choice or by necessity, NOCs would still have the freedom to determine how to make use of the profits they and their subsidiaries generated.[218]

The combined five-year average (2009-2013) of the net profit of PetroChina, Sinopec Corp. and CNOOC Ltd. was more than six times higher than that of Indian NOCs of the same period.[219] Those of their parent companies are not counted in this study since it is not entirely clear if the amounts provided in the three-barrel annual reports have already included those of their subsidiaries. In any event, six times higher net profits should convincingly show that Chinese NOCs are more profitable even though China consumed about 2.9 times more oil than India in 2013.[220] This means that Chinese NOCs had both more capital at their disposal in absolute terms as well as were proportionally more profitable. They definitely had a higher capability to finance projects and adopt measures they saw fit independent of state support.

3.4.2 Chinese Oil Diplomacy Capability

Much has been written about China's vigorous oil diplomacy since top Chinese leaders endorsed and indeed demanded NOCs and other SOEs to "go out" and engage in overseas oil investments and other energy-security related projects in the early 2000s.[221]

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[218] There were indications that the state did try to reduce the moral hazard of wanton overseas investments by NOCs and other SOEs, but not in a way that suggests tighter governance, or any fundamental change in orientation. In June 2011, the State-Owned Assets Supervision and Administration Commission of China (SASAC), the administrator of all central level SOEs, including NOCs, promulgated interim measures on the supervision and management of SOEs and their overseas assets. The part that is most pertinent to the current discussion stipulates that person(s) in charge of SOEs would be held legally liable for losses suffered due to such reasons of not exercising proper control of overseas enterprises, serious pitfalls in the internal control and risk-prevention mechanisms, or engaging in investments without following proper procedures or authority. See "SASAC Interim measures for the administration of overseas property rights of State-Owned Enterprises (Rule 27)" [国务院国有资产监督管理委员会令第 27 号《中央企业境外国有产权管理暂行办法》]. Accessed 27 December 2016, http://www.broadbright.com/pdf/%E4%B8%AD%E5%A4%AE%E4%BC%81%E4%B8%9A%E5%A2%83%E5%A4%96%E5%9B%BD%E6%9C%89%E4%BA%A7%E6%9D%83%E7%AE%A1%E7%90%86%E6%9A%82%E8%A1%8C%E5%8A%9E%E6%B3%95.pdf .

[219] These three companies' combined five-year average net profit is US$39,355.68 million. The sources of information are these companies' annual reports. See Table 14, Appendix C for detailed calculation. As noted in footnote 107 above, the figure for Indian NOCs is US$6,352.94 million.

[220] *BP Statistical Review of World Energy June 2014*.

[221] The "going-out" (走出去) strategy was formally put forward for the first time in October 2000. See Kong, *China's International Petroleum Policy*, 46-47. For some other studies on the subject, see Andrew-Speeds and Dannreuther, *China, Oil and Global Politics*, 63-93; Tunsjo, "Hedging Against Oil Dependency: New Perspectives on China's Energy Security Policy"; and Michel Gueldry and Wei Liang, "China's Global Energy Diplomacy: Behavior Normalization Through Economic

Some of these efforts were done in concert with the investment projects in which Chinese SOEs and their subsidiaries overseas were involved, while others were more general in scope. An example of this latter category was efforts to enhance relationships with Indonesia, Malaysia, and Singapore, the three littoral states of the Strait of Malacca, to prevent "any great power, especially the United States and Japan, from extending its military presence" to the Strait.[222]

Some studies, such as Meckling *et al*'s, compare the oil diplomacy efforts of China and India.[223] They all seem to agree that the Chinese effort has been more robust.[224] Displaying more aggressive oil diplomacy and engaging in it more frequently can be interpreted either as proof of China adopting a higher level of strategic oil supply measures as defined here or as its higher implementation capability of those measures or both. In this comparative study, as in the comparison between India and Thailand, the specialty of and financial support to pertinent Chinese agencies are examined to investigate China's oil diplomacy capability, which in turn is hypothesised to result in the adoption of strategic oil supply measures.

China spent less to maintain its Ministry of Foreign Affairs (MFA) than its Indian counterpart in absolute terms and especially as a percentage of its GDP between 2009 and 2013 according to publicly available official budgets.[225] Unlike its Indian counterpart, the Chinese MFA did not have a department which name suggests specialisation in energy related matters.[226] It appears that oil diplomacy functions are scattered over a number of subordinate departments, such as the Department of International Economic Affairs Department and the Department of West Asian and North African Affairs. The OPEC is one of the regional "cooperation organizations" which relationship with China is managed through the latter department. The Chinese MFA, however, likely has unpublicised groups

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Interdependence or Resource Neo-mercantilism and Power Politics?" *Journal of China Politics* 21 (2016): 217-240.

[222] Kong, *China's International Petroleum Policy*, 131. Kong lists many other Chinese oil diplomacy efforts beyond those directly involving NOCs, such as ports and other infrastructure projects overseas that may help secure oil transportation on pages 129 to132.

[223] Some other examples include: Carl, Rai, and Victor, "Energy and India's Foreign Policy"; Powell, "Geo-politics of India's equity investments in energy."

[224] This does not mean that the authors think the efforts were necessarily more effective in ensuring oil supply security.

[225] The five-year average of the Chinese MFA budgets is US$991.73 million versus Indian MEA's US$1,233.54 million during the same period (already minus the budget of foreign aid and loan). The Chinese MFA budget does not include foreign aid, which was listed in the Chinese Ministry of Commerce (MCOM) budget. The sources for these figures are all from the official websites of the respective ministries. This only amounts to 0.013% of Chinese GDP in the same period whereas the Indian MEA budget was 0.07% of its GDP. For detailed calculation of the Chinese MFA budgets, see Table A15, Appendix C.

[226] For a list of all subordinate divisions, see "Organizational Structure," Chinese MFA website. Accessed 2 January 2017, http://www.fmprc.gov.cn/mfa_eng/wjb_663304/zzjg_663340/.

or personnel that wielded great authority over China's conduct of oil diplomacy.[227] As pointed out in the last section, oil supply security had been elevated to a major concern of China's top leaders soon after this century began.

In addition to the Chinese MFA, the Chinese (MCOM) also undertakes functions that may be considered as oil diplomacy, such as formulating international trade and economic cooperation development strategies and policies.[228] It also contributes considerable funds to such functions by footing bills incurred by "economic and commercial organization personnel stationing in overseas consulates."[229] For these reasons, the part of the MCOM budget these functions are assigned is also included in the calculation in this comparison.[230] Even after this addition, China still spent less on foreign affairs and international trade related functions during the period studied than India.[231] In fact, the average annual amount China spent as a percentage of its GDP was 4.67 times less than that by India.[232] The MCOM, like the MFA, does not have a department with a name that suggests specialisation in promoting energy or oil investments or trade.

How can this lower government spending and apparently greater oil diplomacy capability of China be reconciled? There are a number of logical explanations. First, similar to the situation of China's supposedly grossly under-reported official defence budget, the budgets of the two Chinese ministries examined here might actually be much larger. Still, according to an American think tank report, even the highest outside estimate made was less than double the official Chinese defence budget in 2015.[233] If we assume the situation applies here, China's spending on the two ministries with obvious oil diplomacy functions

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[227] For updated accounts and analyses of China's extensive conduct of oil diplomacy while balancing its overall relations with the United States, see David Zweig and Yufan Hao, ed. *Sino-U.S. Energy Triangles: Resource Diplomacy Under Hegemony* (New York: Routledge, 2016), especially Chapters 3 to 12.

[228] See "Major Functions of MCOM," MCOM website. Accessed 2 January 2017, [商务部的主要职责] http://www.mofcom.gov.cn/article/cwgongzuo/feiyqr/201407/20140700663702.shtml.

[229] This is listed as an explanation of the expenditure under the category of "overseas organizations" in the MCOM budget. See "Year 2013 Final Accounting of the Ministry of Commerce of the People's Republic of China," MCOM website. Accessed 2 January 2017, [中华人民共和国商务部， 商务部 2013 年度部门决算] http://www.mofcom.gov.cn/article/cwgongzuo/feiyqr/201407/20140700663702.shtml.

[230] Similar to the exclusion of India's foreign aid and loans in the Indian MEA budget, the foreign aid part of the MCOM budget is not included in the calculation.

[231] The combined annual average of the relevant budget items of these Chinese ministries was US$1,125 million versus India's US$1,233.54 million. See Table 15, Appendix C for detailed calculation.

[232] China spent about 0.015% of its GDP versus India's 0.07%. See Table A15, Appendix C for detailed calculation.

[233] The official Chinese defense budget was US$146 billion, while the U.S. Department of Defense estimated it to be US$180 billion and the Stockholm International Peace Institute estimated it to be US$214 billion. See "What does China really spend on its military?" Center for Strategic and International Studies website. Accessed 2 January 2017, http://chinapower.csis.org/military-spending/.

would be slightly higher than India's in absolute terms, but still much less proportional to its GDP.

A second explanation is that the source of China's oil diplomacy capability was as much from positive support the government provided as from the lack of procedural and other restraints it placed on ministry officials as well as NOC and other SOE executives. This is the conclusion of Meckling *et al*'s study as well as anecdotal complaints by Indian NOCs when engaged in bidding wars with Chinese NOCs in overseas investment projects. Third, China simply derived greater intangible capability that comes with its UNSC permanent membership as well as with its larger economy and denser trading relationships with foreign countries.

Fourth, there was other not-so-obvious oil diplomacy related Chinese organizations and agencies, most notably banks, that boosted NOCs' overseas investment capability with no comparable counterparts in India. According to Erica Downs' estimate, Chinese state-owned banks made US$74.6 billion "energy-backed loans" to NOCs and governments of oil exporting countries between 2005 and 2010.[234] This, in turn, speaks to the 13 times more foreign exchange reserves China had over India, which has been taken into account in the preliminary study.[235] Finally, a plausible but not probable factor: China actually did not have a higher capability than India, contrary to the conclusion of all known studies that examine the two countries' oil diplomacy activities.

The truth likely is a mixture of all the above explanations, except possibly the last one. When all the sources of capabilities examined in this study and the preliminary analysis are viewed in totality, China's overall implementation capability of strategic oil supply measures would still be at a higher trichotomous level than India's. This would still be true if we assume Chinese oil diplomacy capability was actually more or less the same, not vastly superior than that of India as commonly assumed.

4. Conclusion

The in-depth comparison between India and Thailand with data from the years leading to 2013 confirms that they adopted a similar level of strategic oil supply measures.

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[234] *Inside China, Inc.: China Development Bank's Cross-Border Energy Deals* (Washington, D.C.: John L. Thornton China Center, Brookings, 2011), 39. Also see this study for details of these oil-for-loans deals financed by the China Development Bank and the Export-Import Bank of China, and executed through CNPC and Sinopec.

[235] Downs stresses that the realisation of these deals does not mean that the Chinese state actively tried to push either the banks or NOCs to pursue them all the time and these entities engaged in these deals for a variety of reasons, including importantly to pursue profits. This conclusion does not diminish the fact that Chinese state-owned banks' ability to make such large loans is a testament to the superior material capability of China in the short to medium term (if not its long-term financial health. See more discussion on the historical risks associated with artificially low interest rates to a particular sector in footnote 89 in Chapter Three).

Their OV levels, the overall strengths of private capital in their economies, their overall trust in the oil markets, and implementation capabilities all fell within the same trichotomous level during that period. These conditions again match those proposed by H1 of the vulnerability-interaction model as in the plausibility probe. Applied in a cross-economy situation such as this comparison, H1 suggests a causal pathway in which different net oil importing economies would end up adopting very similar levels of strategic oil supply measures during the same period. This pathway is that the levels of the four explanatory factors hypothesised by the vulnerability-interaction model of the two economies are very similar.

This does not mean that the magnitudes of all the variables of India and Thailand were exactly the same. Viewed in totality with the more cursory data examined in the preliminary study, India "caught up" in the magnitude of its intervention in its petroleum sectors in the form of the country's more market-displacing oil product pricing regime. This, however, began to change with the deregulation of diesel prices in 2014. Private capital, but only in the form of international private capital, was even stronger in Thailand, especially in the petroleum sectors. There is no sign, however, that state capital in the form of SOEs, will be in the retreat any time soon.[236] The differences between the two economies in the other three variables remained very slight, with India having a little higher OV, a little lower trust, and a little higher capability. Considering the great differences between the two countries in many other respects such as population, geographical size, political and economic systems, I argue that H1 passes the test of the most different research design.

The in-depth comparison of China and India with data from the same period confirms that China adopted a level of strategic oil supply measures and had a capability to implement them that were trichotomously higher than India's. At the same time, their OV levels, the overall strengths of private capital in their economies, and their overall trusts in the oil markets all fell within the same trichotomous level. These conditions match the conditions stipulated and the outcome expected by H2 as in the plausibility probe. Applied in a cross-economy situation, H2 suggests one causal pathway that explains the variation in the levels of strategic oil supply measures adopted by different net oil importing economies during the same period.

Upon examination of more detailed data in this comparison, China seems to have adopted an even higher level of strategic oil supply measures in the form of international oil

[236] See Jake Maxwell Watts and Nopparat Chaichalearmmongkol, "In Thailand, a Struggle for Control of State Firms," *The Wall Street Journal*, 17 June 2014. Accessed 5 April 2015, http://www.wsj.com/articles/in-thailand-a-struggle-for-control-of-state-firms-1402930180; "The clash of public and private interests," Thailand's Sustainable Development website. Accessed 16 September 2016, http://www.thailandsustainabledevelopment.com/topics/state-owned-enterprises/.

supply investments through its NOCs and a very restrictive upstream oil sector. China's overall implementation capability was also higher because of its more profitable NOCs. While the magnitudes of China and India's other explanatory variables were similar, China's private capital appeared weaker than India's, especially in the petroleum sector. China's OV and overall trust in the oil markets were slightly lower. As detailed in Chapter Three, H2 derives from the most similar research design. The similarity between China and India in many aspects in addition to the three hypothesised variables accentuates the explanatory power of the variable that was markedly different – their implementation capabilities.

The two in-depth comparisons presented in this Chapter further support the validity of the vulnerability-interaction model. As discussed in Chapter Three, there are not many alternative theories that are specified enough that cover the geographic scope of this project. Due to the configurations of the variable levels of these particular case studies, the option to compare the validity of vulnerability-interaction model with alternatives is further limited.

The India-Thailand case is a case of no substantial variation in any of their variables' levels. The structural realist/geopolitical perspective would also explain the similarity of the levels of strategic oil supply measures they adopted by their similar capabilities and OV levels. This perspective would also explain China's higher DV with its higher capability and illuminate our understanding of its slightly lower OV with its much higher capability.

A conclusion that emerges from the data in this Chapter supports the proposition in Hughes' study that when a domestic oil firm has grown to a size that is near parity with IOCs, it would behave more like them, meaning calling for a more liberalised governance of the country's petroleum sectors. The sizable Indian private oil firm Reliance has shown signs of doing just that.[237] While the subsidiaries of Chinese NOCs were even closer to parity in strength with IOCs than Reliance, they were still tightly controlled by their parents, which enjoyed overwhelming dominance in the domestic market through strict entry barriers. It is, therefore, unsurprising that subsidiaries of the "three barrels" have not clamoured for further liberalisation of the Chinese oil sectors.

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[237] For an example of Reliance behaving in the way IOCs would, see "RNRL fires fresh salvo, trains guns on NELP," *The Economic Times*, August 21, 2009. Accessed 25 September 2016, http://articles.economictimes.indiatimes.com/2009-08-21/news/28452334_1_nelp-new-exploration-licensing-policy-roadshows/2.
BP bought 30% of Reliance's interests in the 23 oil and gas blocks Reliance operated and the two formed a 50:50 joint venture in November 2011 for "sourcing, marketing and transporting natural gas." See "Mukesh Ambani's Reliance Industries inks $7.2 billion deal with BP," February 21, 2011, Forbes website, http://www.forbes.com/sites/naazneenkarmali/2011/02/21/mukesh-ambans-reliance-industries-inks-7-2-billion-deal-with-bp/#305cf2c375b0. See the press release of the forming of joint venture company at, accessed 25 September 2016, http://www.bp.com/content/dam/bp-country/en_in/documents/JV%20announcement%20press%20release.pdf.

Chapter Five
Taiwan's Pathway to High-Level State Intervention in Oil Supply

1. Introduction

Why do some net oil importing economies continue to adopt a high level of strategic oil supply measures decades after crude oil and oil products began to be freely traded in international oil markets? This appears to be especially difficult to explain in economies that are generally free and open. To better understand this phenomenon, this chapter investigates the case of Taiwan in the years preceding 2013 as a deviant case of H3.

As detailed in Chapter Three, H3 of the vulnerability-interaction model proposes a causal pathway to the adoption of a high level of strategic oil supply measures by economies in which private capital generally have a significant level of strength (three-high cases). Specifically, the pathway stipulates a high oil vulnerability (OV), a high level of private capital strength, a high implementation capability, and a medium level of trust in the oil markets. None of the nine case-study economies, in the preliminary study, however, match all these conditions. Taiwan's conditions circa 2013 appear to be the most promising among the initial case studies to offer an answer to the question despite its apparent deviance to some stipulations in the vulnerability-interaction model as it is currently formulated.

Data presented in this Chapter suggest that not having an overall high level of trust in the oil markets to ensure uninterrupted and affordable oil supply at all times is the most critical condition that makes generally open and free economies continue to adopt a high level of strategic oil supply measures. While these economies may have a high financial capability to implement a high level of these measures, they may not have a "high capacity," as expounded by Ikenberry, to free themselves from interventionist commitments of an earlier era.[1] Not having a high level of trust in the oil markets due to securitisation facilitated by these polities' domestic and external contexts makes decision-makers more risk averse. They are hence less resolute in pursuing their larger goal of economic liberalisation in the supposedly more strategic domain of oil supply.

The rest of this Chapter proceeds by first presenting a synopsis of the politics of oil in Taiwan, then by re-assessing in greater depth the accurate level of each variable of the vulnerability-interaction model. Situations unique to Taiwan are introduced and analysed through the prism of the framework of the model. The concluding section synthesises the

[1] These may include, for example, long-established NOC(s) and artificially low oil product pricing. Ikenberry's short definition of state capacity is "the differential ability of states to assert control over political outcomes." See, "The Irony of State Strength: Comparative Responses to the Oil Shocks in the 1970s." *International Organization* 40-1 (1986): 106.

information presented to provide a comprehensive understanding of the pathway to Taiwan's adoption of a high level of strategic oil supply measures around 2013.

2. Politics of Oil in Taiwan

Taiwan's oil industry was dominated by its NOC for the first four decades after the end of the second world war as it had the monopoly to operate in most aspects of the industry. Taiwan's oil sector has gradually liberalised since the late 1980s. The domestic private firm Formosa Petrochemical Corporation (FPC) was established in 1992 to participate in the newly opened-up oil sector.[2] FPC has since formed a duopoly with the NOC in Taiwan's mid- and downstream oil sectors. Oil product prices began to be deregulated in 1993.[3] However, repeated government "stabilisation" of domestic oil prices since and other regulatory issues have mostly discouraged international oil companies from entering Taiwan's oil market up to 2013.

Taiwan's NOC has continued to be the only player in the economy's very small upstream petroleum sector, even after it theoretically lost the monopoly in oil exploration and production (E&P) after 2003. The government's clearly articulated goal of NOC divestment has so far been thwarted by the labour union and other interest groups. It remained 100 percent state-owned and simultaneously acted as the industry administrator throughout the period studied. Taiwan's diplomatic isolation and precarious geopolitical position have created a more pertinent backdrop for parties with vested interests to securitise oil supply to the island.

All these appear to contribute to continued heavy government footprints in Taiwan's oil supply while private investments have been more unfettered in many other sectors in the economy. The conditions of Taiwan did not totally correspond to those stipulated in H3 which proposes to explain this puzzling phenomenon. Verifying Taiwan indeed adopted a high level of strategic oil supply measures during the period studied is the prerequisite for unearthing the pathway leading to their adoption and in refining H3. The rest of this section endeavours to accomplish this.

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[2] For a history of how the parent company of FPC, the Formosa Plastic Company, weaved into the history of the politics of oil in Taiwan, see Yu Jan, "Interactive Mode Between FPC and the KMT Government," Newtalk website, 13 October 2010. Accessed 15 January 2017 [悠然，台塑集團與國民黨政府之互動模式, 新頭殼], http://newtalk.tw/opinion/view/1573. Also see Chu Wan-Wen, "Import Substitution and Export-Led Growth: A Study of Taiwan's Petrochemical Industry," *World Development* Vol. 22-5 (1994): 783-786.

[3] Jung-Hua Wu, Yi-Lung Huang, and Chang-Chen Liu, "Effect of floating pricing policy: An application of system dynamics on oil market after liberalization," *Energy Policy* 39 (2011), 4236.

2.1 Taiwan's Strategic Oil Supply Measures

Among the three economies the preliminary study determines to have adopted a high level of strategic oil supply measures in 2013, Taiwan has the lowest composite score, which is made up of the government's control of crude oil supply to the economy, typically through an NOC, and the size of any petroleum reserves held by government entities.[4] These two aspects of state intervention in Taiwan's oil supply, therefore, are appropriate to constitute this chapter's initial analysis.

2.1.1 Government Control of Crude Oil Supply

The Taiwanese government has been "controlling" crude oil supply to the economy through its wholly-owned and vertically-integrated NOC CPC Corporation (CPC) for decades.[5] The last major aspect of CPC's monopoly in Taiwan's oil sectors, that of crude oil import, however, ended in 1999 when FPC imported its first load of crude oil to the island.[6] The gradual liberalisation of the governance and various oil sectors in Taiwan began in 1987. At that time, private gas stations were allowed to sell gasoline and diesel.[7] In 1996, private firms were allowed to "produce, market, and import/export petroleum products."[8] CPC and FPC have since formed a duopoly in the domestic mid- and downstream oil sectors except for a brief "intrusion" of an international firm (Esso) in 2002-2003.[9]

Taiwan's NOC CPC imported about 44 percent of the oil consumed in the economy in 2013.[10] This was less than half of Indonesia's 100 and China's 99 percent respectively, and was on par with India's 45 and Thailand's 42 percent respectively for the same year.[11] These numbers seem to be an accurate reflection of the hybrid NOC ownership and domestic petroleum sector governance and pricing regime of Taiwan among these economies. Like Chinese and Indonesian NOCs, CPC was and still is wholly-owned by the government. To be precise, it was a subordinate organization of the Republic of China (ROC) Ministry of Economic Affairs (MoEA).[12] Despite its name of a "corporation," it has not been

[4] Indonesia scores the highest, followed by China. See Tables 3.4 in Chapter Three.
[5] The name of the same company went from "China Petroleum Corporation" when it was founded in Shanghai in 1946 by the Republic of China government to CPC Corporation, Taiwan in 2007. CPC was relocated to Taiwan with the nationalist government in 1949. See *CPC Corporation, Taiwan 2014 Annual Report*, 4.
[6] The company was formed earlier in the 1990s and the construction of its processing plants ensued. See "Our History," FPC website. Accessed 2 January 2017, http://www.fpcc.com.tw/en/history.html.
[7] Wu *et al*, "Effect of floating pricing policy," 4236.
[8] Ibid.
[9] Ibid. There is more discussion of this in the Section 4.1 below.
[10] See Table 3.2 in Chapter Three. "[O]nly an extremely small amount" of crude oil CPC fed its refineries was "produced in Taiwan." *CPC Corporation, Taiwan 2014 Annual Report*, 12.
[11] See Table 3.2 in Chapter Three.
[12] It is listed as one of the four "National Corporations" under the "Organization," Ministry of Economic Affairs, R.O.C. website. Accessed 2 January 2017, https://www.moea.gov.tw/Mns/english/introduction/OrganizationList.aspx?menu_id=191.

corporatised or listed in the domestic or any other stock markets as in the cases of Indian and Thai NOCs. Unlike the Chinese or Indonesian cases, however, CPC formally lost its monopoly status in all the oil sectors when the Petroleum Administration Act came into effect at the end of 2001.[13] CPC did not have any publicly-listed subsidiaries like the Chinese "three-barrel" NOCs.

Also unlike the Chinese and Indonesian cases, CPC was and still is slated for privatization. In fact, it was among the first wave of state-owned enterprises (SOEs) in Taiwan that were chosen to go through the process in 2001.[14] The process has stalled for reasons that will be explored in Section 4.2 below. Still, in the years leading to and including 2013, the goal of privatising CPC was repeated in each of the Energy Bureau of MoEA annual reports in the context that many of the sector administrative functions would be taken over by the bureau when that goal eventually materialises.[15]

As it stood in 2013, however, CPC was both a major oil sector operator and the petroleum administer tasked with such functions as the management of retail gas stations, the general management of the oil market, ensuring the safety of the oil and gas industries, and the administration of the petroleum fund and oil subsidies stipulated in the Petroleum Administration Act.[16] Some of these functions obviously put CPC in apparent conflict-of-interest situations as it was one of two major oil sector operators in Taiwan. As the discussions below reveal, CPC was placed in loss-incurring situations. By contrast, Chinese or Indonesian NOC(s) were not saddled with such administrative functions officially during the same period.

Taiwan basically has had a free-floating oil pricing regime, but that regime had been "tinkered" with a number of times since the government took the first step of price decontrol in 1993.[17] The most recent "price stabilisation" effort by the government was gradually and haltingly lifted since April 2012, which returned gasoline and diesel prices to be largely determined by supply and demand dynamics.[18] Even after product prices floated again,

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[13] Huei-Wen Pao, Hsueh-Liang Wu, and Wei-Hwa Pan, "The road to liberalization: Policy design and implementation of Taiwan's privatization" *International Economics and Economic Policy*, 5-3 (2008): 330.

[14] Ibid., 335.

[15] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2013 Annual Report* [經濟部能源局一 0一年年報], 35; 2012 Report, 31; 2011 Annual Report, 27; 2010 Annual Report, 27, and 2009 Annual Report, 25. One interesting point is that in the reports between 2009 and 2012, the phrasing is "If it [CPC] is privatised in the future…" whereas in the 2013 report, the phrase used is "CPC will be privatised in the future."

[16] These functions were listed in the various Bureau of Energy annual reports as ones the Bureau would take up when CPC is privatised.

[17] Pao *et al*, "The road to liberalization," 4236-4238.

[18] Between December 2010 and March 2012, CPC implemented the government's oil price stabilisation policy in which its gasoline and diesel prices only reflected half of the actual price hike in the international markets. The government put forward a gradual "price rationalisation" program in April 2012 wherein CPC product prices were supposed to go up the same amount as actual price

subsidies given to an array of groups in the Taiwanese society continued. These included mass transit operators and taxi drivers, agricultural and fishing sector operators, people with disabilities, and people living in aboriginal mountainous areas and outlying islands.[19] The subsidies were financed with the petroleum fund, levied as fees on oil refiners, importers and exporters, as well as distributors across the board.[20] Taiwan's petroleum fund has played more extensive roles than Thailand's oil stabilisation fund, one of which is to create and maintain the second strategic oil supply measure examined in the preliminary study – stockpiling of oil.[21]

2.1.2 Strategic Petroleum Reserve

The Taiwanese government decided to establish a strategic petroleum reserve (SPR) in 2001 to "stabilise domestic petroleum supply."[22] The Taiwan Research Institute, a "privately-funded" but publicly-oriented think tank "operated by academic elites," was tasked to administer the SPR.[23] The Petroleum Administration Act stipulates that the government has to keep 30 days of oil consumption.[24] The government completed stockpiling 2,830,000 kiloliters of oil in 2007, which was "no less than the equivalent of 30 days of the needs of the economy," about 57% of which was in the form of crude oil and the rest in the form of oil products.[25] In addition, all oil refiners and importers operating in Taiwan must stockpile the equivalent of 60 days of the average amount consumed in the economy in the previous 12 months, pro rata to their share of the market. Refiners also have to stockpile a minimum of an additional 50,000 kiloliters and importer an additional 10,000

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hike, but would only fall halfway when prices came down until it recuperated all the losses previously incurred. See *Bureau of Energy, Ministry of Economic Affairs [ROC] 2012 Annual Report*, 33. This rationalisation was eventually aborted and was reinstated in October 2013 due to negative public comments on the policy. See Huei-Chu Liao and Shi Ting Jhou, "Taiwan's Severe Energy Security Challenges," Brookings Institute website, September 2013, accessed February 27, 2016, http://www.brookings.edu/research/opinions/2013/09/12-taiwan-energy-security-liao.

[19] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2012 Annual Report*, 33-34, 42.

[20] *Petroleum Administrative Act* 11 October, 2001, Chapter Six, articles 34 and 45 [制定石油管理法], accessed 5 January 2017, http://www.president.gov.tw/Default.aspx?tabid=84&lctl=view&itemid=2066&ctid=96&q=

[21] In addition to the two functions mentioned, the fund was also tasked to promote oil and gas E&P, energy policy research, R&D of oil exploration and alternative energies, and other measures "necessary to stabilise oil supply and maintain the order of the oil product market." *Petroleum Administrative Act*, Chapter Six, article 36. More detailed explanations are given to these functions in the three subsequent amendments to the Act, the last of which was in January 2011. See the Taiwanese government posting the texts of the amendments in the following official website, accessed 5 January 2017, http://www.ey.gov.tw/Upload/RelFile/2016/661383/eac9f7af-1522-4b2a-81a2-3c716d37680f.pdf.

[22] "Management Services of Government-Owned Petroleum Reserves," Taiwan Research Institute website, accessed 3 January 2016, http://www.tri.org.tw/english/research_e/research3.php?id=24.

[23] Ibid. For information about the Taiwan Research Institute, see "Mission and Goals," Taiwan Research Institute website, accessed 4 January 2017, http://www.tri.org.tw/english/.

[24] "Management Services of Government-Owned Petroleum Reserves."

[25] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2013 Annual Report*, 36.

kiloliters.[26] Both the NOC CPC and the private firm FPC must comply with this Act and in fact must report their stockpiling amount to the Energy Bureau weekly and be subjected to irregular inspections.[27]

Taiwan, therefore, maintained a SPR equivalent to at least 90 days of its oil import according to the definition of this study and since the government completed its own stockpile in 2007.[28] It scored the highest among the three economies receiving an overall high level of DV in the preliminary study for this more market-conforming strategic oil supply measures.[29] In fact, Taiwan had the largest SPR size among all nine-case economies except South Korea in 2013.[30]

2.1.3 Overseas Oil Supply Projects

Apart from these two strategic oil supply measures examined in the preliminary study, the Taiwanese government also adopted measures investigated in the comparative studies in Chapter Four. CPC, through its subsidiary Overseas Petroleum and Investment Company (OPIC), did engage in overseas oil supply investment projects during the period under review.[31] As of the end of 2013, CPC was engaged in 25 overseas oil and gas E&P projects in 10 countries, 13 of which were already hydrocarbon producing.[32] Some examples include Blocks 16 and 17 in Ecuador, Indonesia's Sanga, Niger's Agadem, and the Hurricane Creek project in Louisiana, U.S.A., producing 5.45 million barrels, or about 1.7 percent of the economy's consumption of oil that year.[33] These efforts yielded similar results

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[26] Ibid. Some commentators have raised doubts of the compliance of these stockpiling stipulations by companies, but without concrete proof of otherwise, this project would use these official figures.
[27] Ibid.
[28] Since Taiwan had almost a 100% oil import dependency during the period studied, the amount of consumption was basically the same as the amount of import.
[29] China had 17 and Indonesia had 47 days equivalent of SPR in 2013. See Table 3.3 in Chapter Three.
[30] South Korea's SPR was the equivalent of 122 days of import in 2013. Ibid.
[31] OPIC is a shell company of CPC registered in Panama in 1979 for the purpose of overseas oil and gas E&P activities. See "Matters Related U.S. Trip to Assist Handover of OAI/OHI's Chief Financial Officer," Overseas Business Trip Reports Information Network [ROC] website, accessed 5 January, 2017 [赴美國 OAI/OHI 協助財務長交接事宜, 公務出國報告資訊網], http://report.nat.gov.tw/ReportFront/report_detail.jspx?sysId=C09601582.
CPC has other affiliates engaging in businesses in different oil sectors and many with names that are variants of OPIC, in at least ten countries. For the list of these companies, see "Overseas cooperation points of CPC," [CPC] Corporate Social Responsibility website, accessed 7 January 2017[中油公司海外合作據點], http://cpc.demosite.tw/csr/management/intro-explain-2.aspx.
[32] *CPC Corporation, Taiwan 2014 Annual Report*, 8.
[33] Ibid. The percentage figure is calculated with the conversion rate between barrel and ton of oil in the *BP Statistical Review of World Energy June 2014*, 44 and Taiwan's million ton of oil consumption in the same report (page 10). For a detailed introduction to the CPC's upstream activities in the period studied and beyond, see *Taiwan Petroleum Exploration 2011-2015 - Volume Eight*, 6-39 (Chapter One - Introduction), CPC Exploration and Production Business Division website, accessed 5 January 2017 [台灣石油探勘紀要第八冊，第一章 概述，台灣中油股份有限公司探採事業部], http://new.cpc.com.tw/division/epb/information-text.aspx?ID=124.

in recent years. In 2008 for example, CPC received 5.89 million barrels of equity crude from its overseas projects.[34] These results were of a much smaller scale proportionally than the overseas hydrocarbon yields of Chinese NOCs,[35] but larger than Indonesia's in 2013,[36] the other two case studies the preliminary study determined to have adopted a high level of strategic oil supply measures.

2.1.4 Preferential Hydrocarbon E&P

Taiwan has had almost no hydrocarbon resources left within its territories to speak of in the last two decades. At first glance, therefore, the measure of preference given to NOCs in indigenous oil development does not seem applicable. In fact, it does in a de facto, not a legal, way. One of the statutory functions of the Taiwanese petroleum fund mentioned earlier is to "encourage domestic [petroleum] sector operators to engage in oil and gas exploration and development work domestically and overseas."[37] The maximum subsidy was 50 percent for exploration projects and 12 percent for development projects, presumably of the project costs.[38] These subsidies do not give preference to the NOC, but to all *domestic operators* [國内業者]. This is in line with stipulations in the Mining Act which allows all ROC people to apply for the right to explore and produce minerals, including oil and gas, "within the territories, special economic zone, and continental shelf of the ROC."[39]

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[34] *CPC Corporation, Taiwan 2009 Annual Report*, 12 [2009 台灣中油股份有限公司年報]. For a detailed breakdown of all CPC overseas hydrocarbon projects, including the equity shares and production amounts of each, see Bureau of Energy, Ministry of Economic Affairs Annual Reports of the years studied under the chapter on Petroleum Industry.

[35] As reported in Chapter Four, the largest Chinese NOC CNPC produced 35.5 million tons of equity oil and gas in 2013. CPC's figure would be higher than the 5.45 million barrels (or 0.74338 million ton) cited here since it also produced 351 million cubic meters of natural gas in that year according to the same annual report. Even generously doubling the CPC figure means it only produced about 3.5% of Taiwan's oil consumed whereas the figure of CNPC alone equaled to about 7% of the oil China consumed that year. This has not even included the production of the two smaller "barrels."

[36] The Indonesian NOC Pertamina did not report any overseas hydrocarbon production yield in its 2013 annual report. The company website lists overseas E&P projects in a number of countries, such as offshore Vietnam, Malaysia, and Sudan, but does not specify the yields of these projects. See "Overseas Operation," Pertamina website, accessed 5 January 2017, http://www.pertamina.com/en/company-profile/our-networks/overseas-operation/.

[37] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2013 Annual Report*, 37.

[38] The texts specifying these percentages were a little ambiguous if these percentages pertain to the total project costs. Ibid. These percentages have not changed over the years. They had been the same from at least 2007 on. The sources are the same Bureau of Energy annual reports. The Petroleum Administration does not specify these percentages.

[39] According to the constitution and the amended ROC Mineral Act of 2003, which covered the period studied, the ROC government has ownership of all mineral rights on and off shore of Taiwan, but "people of ROC" can apply for the right of exploring and producing almost all minerals, including oil and gas. See Meng-yu Hsieh, "Introduction to Our Country's Mining Laws," *Taiwan Bar Journal* 19-12 (2015), 19. [謝孟羽, 我國礦業法制之初探, 全國律師, 第 19 卷 第 12 期]. The English translation of the current version of the Act, amended in 2016, uses the term "natural or juridical person of ROC," which suggests corporations registered in ROC can also apply for mining rights. This appears to open up the possibility of foreign-owned parents of ROC corporations to apply for oil and gas E&P. The Chinese versions of the current Act as well as the 2003 version simply use the

The ROC government established five offshore hydrocarbon mining regions in 1970.[40] At the same time, due to the capital- and especially advanced technology-intensive nature of offshore E&P, the government also endowed CPC with the right to exploring and producing the resources either by itself or in cooperation with foreign companies.[41] After the 2003 amendments to the Mining Act, not only on and offshore oil E&P were opened to all domestic operators, the government no longer drew up fixed E&P blocks for applicants to engage in their business. Instead, applicants could draw up their proposed exploration areas and plans for approval.[42] Still, this amendment was not retroactive and it contained a sunset clause which let CPC receive the priority to apply for hydrocarbon E&P rights in projects in which it had already been engaging. These included offshore projects in its first offshore petroleum E&P region.[43]

The road of CPC's offshore hydrocarbon exploration was long and torturous, which serves as an illustration of the systemic changes and geopolitical situations Taiwan has been facing for the last few decades. These circumstances appear to have acted as an explanatory variable that impacted on all the other variables and will be explored further later in the chapter. For offshore hydrocarbon E&P, CPC has taken on a number of external cooperation partners, such as with CNOOC in the Taichao project, with Husky Energy in the Tainan Basin, and with CNOOC and Total in the Taiyang deep water project.[44]

Between 2007 and 2013, the petroleum fund subsidies were awarded to 26 hydrocarbon E&P exploration projects to cover on average 40 percent of their costs.[45] Eleven of the approved projects or about 42 percent of them were in fact onshore or offshore domestic projects.[46] Two of them actually yielded natural gas. The one in Miaoli County began production in 2011,[47] while the Kuantien well in Tainan City and the Fengshan well

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term "people of ROC." For the official English translation of the current Act, see "Mining Act," Laws & Regulations Database of The Republic of China, accessed 8 January 2017, http://law.moj.gov.tw/Eng/LawClass/LawAll.aspx?PCode=J0020001. For the Chinese version of the 2003 Act, which covered the period studied, see Mining Act (2003) [礦業法 (民國 92 年)], accessed 8 January 2017, https://zh.wikisource.org/zh-hant/%E7%A4%A6%E6%A5%AD%E6%B3%95_(%E6%B0%91%E5%9C%8B92%E5%B9%B4).

[40] Tseng Hung-Chih, "Establishment of our country's offshore oil E&P regions and cooperation with foreign companies to explore oil," *Mining and Metallurgy* 56-3 (2012): 11. [曾弘志, 我國海域石油礦區之劃立及外資參與合作探油, 鑛冶 第五十六卷 第三期 中華民國一 O 一年九月出版].

[41] Ibid.

[42] Ibid., 20.

[43] These projects originated in 1973 and were extended to 2013, could be extended for another 20 years. Ibid., 18-19.

[44] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2013 Annual Report*, 37.

[45] *Bureau of Energy, Ministry of Economic Affairs [ROC] Annual Reports 2013-2007*, pages 37, 34, 29, 30, 30, and 28 respectively.

[46] Ibid.

[47] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2011 Annual Report*, 29.

in Kaohisuang City were undergoing production assessment as of 2012.[48] FPC, the only other crude oil importer in Taiwan during the period studied, received subsidies for two projects only. One was for the exploration of the Mowry block in central Wyoming, U.S.A. in 2007,[49] and the other for the exploration of the Maverick Basin in Texas.[50]

The fact that FPC, which had been a mid- to downstream company (refiner, distributor, and gas station operator), only set up an upstream subsidiary in the United States at the end of 2006, not its private company status, may explain its low rate of receiving the E&P subsidies.[51] In addition, as the information from the last paragraph shows that whatever paltry hydrocarbon resources left on Taiwan seemed to be natural gas, not oil. Up until the passage of the Natural Gas Enterprise Act in February 2011, CPC played a monopolistic role in natural gas wholesaling and exploration.[52] Still, all these factors converge to have created a de facto "preference" given to the NOC for E&P. Besides, the language of the law seemed to give actual legal preference to domestic oil companies.

The rationale of these government funded subsidies was made clear by the variants of the following sentence in all the Energy Bureau annual reports examined: "To control oil and gas at their sources and to increase the rate of self-developed oil and gas."[53] The use of the term "self-developed" is very similar to the way it has been used in Japan, another advanced economy in Asia almost totally devoid of hydrocarbon resources. Indeed, this whole idea of government subsidies to all domestic firms to develop oil and gas was similar to the Japanese government-guaranteed credits to finance Japanese oil firms for overseas oil and gas projects. The Taiwanese way was more direct and so more market-displacing, both in the measure's administration and its actual execution through a vertically integrated NOC, the CPC. In spite of or because of that, the rates of "self-developed" oil by Japanese firms were a few times higher during the period studied.[54]

In sum, this section shows that the Taiwanese government indeed continued to play a large role in the supply of oil to the economy in the years leading to 2013, despite its stated

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[48] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2012 Annual Report*, 34.
[49] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2007 Annual Report*, 30.
[50] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2007 Annual Report*, 28.
[51] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2007 Annual Report*, 29.
[52] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2010 Annual Report*, 33. Also see Anton Ming-Zhi Gao, *Regulating Gas Liberalization: A Comparative Study on Unbundling and Open Access Regimes in the US, Europe, Japan, South Korea and Taiwan* (New York: International, 2010), 300. For the full texts of the official translation of the Natural Gas Enterprise Act in Chinese [天然氣事業法], see "Natural Gas Enterprise Act," Laws & Regulations Database of the ROC website, accessed 5 January 2017, http://law.moj.gov.tw/Eng/LawClass/LawAll.aspx?PCode=J0130045.
[53] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2013 Annual Report*, 37.
[54] The Japanese average appears to be between 10 to 12 percent (see footnote 49 in Chapter Three for details of sources of this figure) while the Taiwanese figure is estimated to be about 2 percent. See discussions earlier in this section.

goal of and actual steps taken to liberalise the petroleum sectors more than a decade earlier. It adopted a high level of strategic oil supply measures, ranging from the most market-displacing one of complete ownership of a vertically integrated NOC with many sector administration functions to the less market-displacing oil product pricing and E&P subsidies policies to the more market-conforming, but still government-owned SPR. With the premise of Taiwan case study established, the following sections delve into the possible causes of this high level of intervention.

3. Taiwan's Oil Vulnerability

The causal pathway leading to the adoption of a high level of strategic oil measures as suggested by H3 stipulates an economy to have a high level of OV. This is one of the apparently "deviant" explanatory variables of Taiwan. The preliminary study determines that Taiwan's OV only reached a trichotomously medium level in 2013. In this section, Taiwan's OV is investigated to verify its level. The same two additional measures examined in the comparative studies in Chapter Four, one for market risk and one for supply risk, are calculated for Taiwan.

Using the same method of calculation, the 2013 oil intensity of Taiwan's economy was 0.047.[55] This was higher than China's 0.031 and India's 0.027, but lower than Thailand's 0.050.[56] All three of these economies receive a low level of OV in the preliminary study, which did not take oil intensity into consideration. The same modified HHI index used in the comparative studies in Chapter Four is used to calculate Taiwan's oil supply risk caused by the concentration and stability of countries of its crude oil supply in 2013, with the result of 89.57.[57] This is slightly higher than India's 87.24, but considerably higher than Thailand's 68.94 and China's 66.88 of the same year. Thailand would be able to somewhat "offset" the risk associated with its higher oil intensity with its lower crude oil source risk while India could do the opposite. Taiwan, however, was stuck with both a higher oil intensity and a high crude oil source risk in 2013.

Taiwan's OV was certainly at least one level higher than China, India, and Thailand's. The question was whether it was actually as high as the two economies

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[55] The same *BP Statistical Review of World Energy June 2014* is used as the source of Taiwan's oil consumption. The data source for Taiwan's 2013 figure is from "Real GDP at Constant National Prices for Province of China Taiwan," Economic Research of [U.S.] Federal Reserve Bank of St. Louis website, accessed 3 January 2017, https://fred.stlouisfed.org/series/RGDPNATWA666NRU. Again, as in Chapter Four, the results represents ton of oil consumed/thousand US$ of GDP.

[56] See Section 2.2 and 3.2 in Chapter Four.

[57] The source of Taiwan's crude oil supply is from the Excel file titled "Crude Oil Import Sources," Bureau of Energy statistics website, accessed 5 January 2017, [原油進口來源] http://web3.moeaboe.gov.tw/ECW/populace/web_book/WebReports.aspx?book=M_CH&menu_id=142

The source of the country risks is from the same PRS Group report.

determined to have a high OV in the preliminary study, Japan and Singapore. Again, using the same method of calculation, Japan's oil intensity was 0.046 and Singapore's 0.157,[58] while the concentration risks of sources of their crude oil supplies was 69.81 and 61.44 in 2013 respectively.[59]

Singapore's unusually high OV, especially oil intensity, as currently formulated, was somewhat exaggerated due to its high oil consumption figure relative to its small population.[60] Oil trading and refining have been an important part of the Singaporean economy[61]and a large portion of its crude import no doubt was to feed its outsized refining capacity relative to its population. With a population of just over five million in 2013, Singapore had almost 4.5% of refining capacity in the Asia Pacific, higher than Thailand's 4%, which had a population of 67 million.[62] The same situation also applied to Taiwan and South Korea to a lesser extent. Taiwan had 3.8% of the region's refining capacity, but less than one third of Thailand's population, while South Korea had 9.2% of the capacity and about three quarters of Thailand's population.[63] Thailand was not a country with unusually low refining capacity in the region either.[64]

The OVs of Singapore, South Korea, and Taiwan were only somewhat exaggerated because even if a portion of the oil they imported were used as raw materials to their export-oriented oil refining or petrochemical industries and not all for the basic needs or daily functioning of their populations their economies, these economies were still vulnerable to price volatility and supply disruption. The difference is that the burden of the risks would be distributed differently than in economies not so heavily dependent on such industries.

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[58] The source of oil consumed is *BP Statistical Review of World Energy June 2014*. The source of purchasing power parity in 2011 US$ is from the World Bank, accessed 5 January 2017, http://data.worldbank.org/indicator/NY.GDP.MKTP.PP.KD.

[59] The same methodology and source of country risk is used. The source of their crude oil supply is from the same (as in China, India, and Thailand) MIT Economic Complexity Observatory project site. See footnote 38 in Chapter Four for more details.

[60] It has the highest OV score among the nine case-study economies in the preliminary study, which is almost 23% higher than the score of Japan, the only other high DV economy.

[61] See "Energy – Industry Background" website, Government of Singapore, accessed 6 January 2017, https://www.edb.gov.sg/content/edb/en/industries/industries/energy.html.

[62] Refining capacities are calculated with *BP Statistical Review of World Energy June 2014*, 16. Sources of populations are from the World Bank website, accessed 20 June, 2016, http://data.worldbank.org/indicator/SP.POP.TOTL.

[63] Ibid.

[64] Its population to refining capacity ratio in the region (1.95) is higher China's (0.96), India's (0.36), and Indonesia's (0.44), but lower than Japan's (3.34), Singapore's (26.69), South Korea's (5.91) and Taiwan's (5.28). This is not a perfect measurement since only the 2013 population of the nine case studies, not all economies in the region are used for the calculation. These ratios would be even higher if the populations of the other economies are incorporated since their populations collectively would make up a higher percentage of the regional total than their collective refining capacity of 5.6%, according to *BP Statistical Review of World Energy June 2014*.

Japan's OV score in the preliminary study is a little less than 10 percent higher than Taiwan's.[65] Its oil intensity was about the same as Taiwan's, but its crude source concentration risk was about 22 percent lower in 2013. This would slightly narrow the gap between the two economies' overall OV, but it does not appear that Taiwan's OV would edge up enough to be classified as high in the Asia Pacific region even if the outlier case of Singapore is temporarily put aside. Japan's higher ratio of oil-to-total primary energy consumption (44 versus Taiwan's 39 percent), and its greater share of total global oil import (11 versus Taiwan's 2 percent), are not likely to change soon.[66] These are the two out of the four components of OV measures in the preliminary study that result in Japan's higher OV than Taiwan's.

Taiwan may, however, be considered an economy with a high OV on a global scale as the Asia-Pacific's 27.7 percent oil self-sufficiency was much lower than any other region in the world.[67] As Table 5.1 below indicates, the region that had the next lowest rate, North America, still produced over 76% of the oil it consumed. With the shale revolution in the United States, this rate goes up further in the years immediately after 2013:[68]

Year 2013	**Oil Consumption (million tonnes)**	**Oil Production (million tonnes)**	**Oil self-Sufficiency Rate**
Africa	170.90	418.60	244.94%
Asia Pacific	1,415.00	392.00	27.70%
Europe & Eurasia	878.60	837.50	95.32%
Middle East	384.80	1,329.30	345.45%
North America	1,024.20	781.10	76.26%
South & Central America	311.60	373.40	119.83%

Table 5.1 Oil Self-Sufficiency Rates in Regions of the World in 2013

The measures examined in this section so far suggest that Taiwan's OV was between medium to high in years leading to 2013. Transit route risk, which is different from supply concentration risk, however, has not been be taken into account. As in China, this risk seemed to loom larger for Taiwan than many other economies in the region. The source of Taiwan's anxiety about its oil transit routes, in contrast to China's, appeared to originate from across the Taiwan Strait instead of across the Pacific Ocean. As in the case of China, however, any such worries had yet to be materialised, and so they fall in the realm of trust

[65] Japan OV score, calculated with the four measures detailed in Chapter Three, was 38.8 and that of Taiwan was 35.36.
[66] The data source of all these calculations is from *BP Statistical Review of World Energy June 2014*.
[67] Ibid.
[68] It was 84.7% in 2014 and 87.84% in 2015. The source for the calculation is *BP Statistical Review of World Energy June 2016*, 9-10.

or belief, which will be further investigated in the section focusing on trust in the oil markets below.

4. Strength of Taiwan's Private Capital

The only explanatory variable level that conforms to the stipulation of H3 for Taiwan in the preliminary study is that private capital in the economy is determined to have reached a high level of strength versus that of state capital in 2013. This conclusion was based on the high combined average economic freedom score Taiwan received. In fact, its score is the second highest among the nine case-study economies, 10 percent lower than Singapore's but more than two percent higher than Japan's,[69] the other case-study economy that reached a trichotomously high level for this variable.

In this section, as in the comparative studies in Chapter Four, the historical-institutional and the actor-specific sources of private capital strength, especially in the petroleum sector as whole, are disaggregated and investigated separately to provide a more comprehensive and accurate picture of the overall strength of private capital in Taiwan in the years leading to 2013.

Many of the aspects that reflect the historical and institutional equilibria of the strength among international, domestic, and state capitals are already taken into account by the two "off-the-shelf" economic freedom indicators, which are also used in gauging the overall economic freedom of all the other case-study economies in earlier chapters. The following table, reproduced from a MoEA Investment Commission-funded report on Taiwan's effort in attracting inbound foreign direct investments (FDI), provides three-economy comparisons of the economic freedom and competitiveness among Taiwan, Singapore, and South Korea between 2007 and 2013.[70]

Evaluation Organization	Evaluative Index	2007			2013			Change in Ranking 07-13		
		TA	SG	SK	TA	SG	SK	TA	SG	SK
IMD	World Competitiveness	18	2	29	11	5	22	+7	-3	+7
WEF	Global Competitiveness	14	7	11	12	2	25	+2	+5	-14
Heritage Foundation	Economic Freedom	29	2	39	20	2	34	+9	-	+5

[69] Singapore's score is 86.65, Taiwan's is 76.15 and Japan's is 73.70. See Table 3.6 in Chapter Three.

[70] Yang Shu-fei *et al*, *Research and Analysis of Investment Trends – Research on Taiwan's Strategies of Attracting Foreign Direct Investments – Final Report 2013*, Chung-Hua Institute for Economic Research, 189. Investment Commission, MoEA website, accessed 6 January 2017. [分項計劃主持人：楊書菲，中華經濟研究院。投資趨勢分析與研究 - 臺灣吸引外人投資策略研究期末報告。經濟部投資審議委員會 102 年度 專案計畫 期 末 執行成果報告] www.moeaic.gov.tw/download-file.jsp;jsessionid...?id=J7g4WQ%2FzysI%3D.

BERI	Business Risk Service	6	2	21	3	1	13	+3	+1	+8
World Bank	Doing Business	50	1	30	16	1	7	+34	-	+23

WEF=World Economic Forum BERI=Business Environment Risk Intelligence
TW=Taiwan SG=Singapore SK=South Korea

Table 5.2 Changes in Taiwan, Singapore, and South Korea's Economic Competitiveness or Freedom between 2007 and 2013

The rankings shown on Table 5.2 suggest that on the whole, Taiwan's institutional support to private capital has consistently improved in the seven years between 2007 and 2013 and should be in place for robust private economic activities in general in Taiwan by 2013.

The same four-scenario framework describing the domestic-international-capital-state balance developed in Chapter Two and applied in the comparative studies in Chapter Four is again used in this chapter to guide the investigation of the actor-specific source of private capital strength in Taiwan in the period studied.

4.1 International-Domestic-State Capital Balance in Taiwan

The strength of international capital was not high in Taiwan although there were generally few restrictions on foreign investments by the period studied.[71] The ten-year (2004-2013) average of FDI inflow only made up of 3.55% of the economy's gross fixed capital formation, a lot lower than the nine case-study average of 13.08%.[72] This average is skewed by the unusually high percentage of Singapore (74.05%), but Taiwan's number is still lower than 5.46% eight case-study average that excludes Singapore or the Asian average of 8.84%. In 2011 that percentage even turned negative, which means the FDI outflow was greater than the inflow that year. The only other case-study economy that experienced negative FDI inflow in that decade was Japan. Table 5.3 below summarises these findings:

[71] The "'negative' list of industries closed to foreign investment…[were] public utilities, power distribution, natural gas, postal service, telecommunications, mass media firms, and air and sea transportation." See "2013 Investment Climate Statement," U.S. Department of State website, February 2013. Accessed 2 February 2017, https://www.state.gov/e/eb/rls/othr/ics/2013/204742.htm.
[72] The data source of the calculation is the United Nations Conference on Trade and Development (UNCTD). See "Annex table 06, FDI inflows as a percentage of gross fixed capital formation, 1990-2015," UNCTD website, accessed 7 January 2017, http://unctad.org/en/Pages/DIAE/World%20Investment%20Report/Annex-Tables.aspx.

	FDI inflows as a percentage of gross fixed capital formation, 2004-2013 (%)										
Region/economy	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	10-yr average
World	7.0	8.7	11.6	13.7	9.8	8.5	9.2	9.1	8.5	7.8	**9.38**
European Union	7.0	15.4	16.2	20.7	7.4	11.1	11.3	11.5	13.1	9.2	**12.28**
North America	4.6	4.0	8.6	9.4	10.6	5.6	7.4	8.3	6.6	7.8	**7.29**
Canada	- 0.2	10.0	20.0	34.1	16.9	7.4	7.5	9.4	9.6	16.3	**13.10**
United States	5.0	3.5	7.5	6.7	9.9	5.4	7.4	8.1	6.1	6.6	**6.63**
Asia	9.5	10.3	11.4	11.2	10.1	7.8	8.4	7.2	6.4	6.2	**8.84**
China	7.8	8.0	6.8	6.2	6.0	4.2	4.3	3.7	3.2	2.9	**5.32**
India	2.8	3.0	6.9	6.2	12.3	8.2	5.2	5.8	4.0	4.8	**5.91**
Indonesia	2.6	9.8	4.5	5.1	5.3	2.7	5.9	6.9	6.4	6.4	**5.56**
Japan	0.8	0.3	- 0.7	2.3	2.2	1.1	- 0.1	- 0.1	0.1	0.2	**0.61**
Philippines	3.7	9.0	11.9	9.8	4.5	6.1	3.2	4.4	5.0	4.4	**6.20**
Singapore	87.1	61.5	108.3	108.3	22.4	42.3	89.2	68.7	73.8	78.8	**74.05**
South Korea	5.6	4.9	2.9	2.6	3.6	3.2	2.8	2.7	2.6	3.3	**3.43**
Taiwan	2.2	1.8	7.9	8.0	5.6	3.4	2.4	- 1.7	2.9	3.2	**3.55**
Thailand	13.6	15.3	14.3	11.8	11.7	11.9	17.8	3.4	15.4	15.6	**13.10**
									nine case-study 10-yr average		**13.08**
									eight case-study (minus Singapore) 10-yr average		**5.46**

Source: ©UNCTAD, FDI/MNE database (www.unctad.org/fdistatistics).
Note: Totals exclude the financial centres in the Caribbean.
http://unctad.org/en/Pages/DIAE/World%20Investment%20Report/Annex-Tables.aspx

Table 5.3 FDI inflows as percentage of gross fixed capital formation 2004-2013

Surveys of foreign enterprises in Taiwan suggest that there has been a contradiction of strong institutional potentials for but lacklustre performance of foreign investments. This was a manifestation of the government's active measures courting international capital and its simultaneous concern that overdevelopment of foreign firms would "squeeze the operation space of domestic firms."[73] In general, respondents of the surveys think Taiwan still exhibited a strong protectionist tendency, had a slow pace of decision-making and implementation, and too strict or insufficiently transparent laws and regulations.[74] This is not an uncommon litany of complaints multinational corporations have against many host governments. Yet, the contradiction between the Taiwanese government's declared guiding economic principle of liberalisation, including in the petroleum sectors, and its countervailing concerns seemed to be equally strong.[75] Factors contributing to this contradiction are further discussed regarding the government's liberalisation effort below.

[73] Yang, *et al*, *Research and Analysis of Investment Trends – Research on Taiwan's Strategies of Attracting Foreign Direct Investments*, 134.
[74] Ibid.
[75] In each of the Bureau of Energy annual report since 2007, for example, the goal of the bureau has been said to "actively push forward energy enterprise liberalization, privatization, opening up … the oil refining industry in response to major changes in energy policies as part of the economic development policy of internationalization and liberalization." See for example page 2 of *Bureau of Energy, Ministry of Economic Affairs [ROC] 2013 Annual Report*. These goals, however, are not explicitly listed in the Petroleum Act of 2001 and its subsequently amended versions. Instead, article 1, Chapter 1 sounds like more "paternalistic" or "protective": "The Petroleum Administration Act (henceforth the Act) is being instituted to promote the sound development of the oil industry, to safeguard the production and sales of oil, to ensure the steady supply of oil, to enhance people's livelihoods, and to develop the national economy while at the same time give equal consideration to environmental protection." See "Petroleum Administration Act," Laws & Regulations Database of The Republic of China website. Accessed 12 January 2017, http://law.moj.gov.tw/LawClass/LawAll.aspx?PCode=J0020019.

In the petroleum sectors, CPC and the domestic private firm FPC have been functioning as duopolistic operators since 1999. ESSO, a joint venture between ExxonMobil and a private Taiwanese oil terminal services company, Pan Overseas Corporation, entered the Taiwan oil market in 2002, right after the formal liberalisation of the sector.[76] The supposedly liberalised domestic oil product pricing, however, was sometimes "tampered with" by the government price stabilisation effort via the CPC as discussed in Section 2.1 above. If private firms fail to match the low pricing of CPC, they would lose market shares.[77] Without the advantage of having its own transportation and gas stations, Esso "phase[d] out its Taiwan retail business in gasoline and diesel by the end of 2003."[78] No other foreign oil refiner, importer, or retailer was interested in entering the Taiwanese market since up to 2013.[79]

Taiwan's small upstream oil sector has been dominated by CPC as earlier discussions in this chapter has illustrated. Foreign oil firms or international capital were brought in as partners of CPC in the technology-intensive offshore E&P, but these projects had yet to produce any tangible yields by 2013. International capital was infused in Taiwan's upstream oil sector in a significant way indirectly through joint venture overseas E&P projects with OPIC, CPC's overseas arm.[80] Such cooperation dated back to the 1970s in the Philippines and then in Indonesia, even before the establishment of OPIC.[81] In recent years the exploration projects that actually yielded positive results concentrated in the United States.[82]

This "participation" of international capital in Taiwan upstream sector did not bring it into direct competition with domestic private oil firms since there were almost no indigenous resources in Taiwan left for development. The hydrocarbon E&P subsidy system

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[76] Wu *et al*, "Effect of floating pricing policy: An application of system dynamics on oil market after liberalization," 4236. For the history and businesses of Pan Overseas Corporation, also known as Prime Oil Chemical Service Corp, see "Company Overview," Prime Oil Chemical Service Corporation, accessed 7 January 2017, http://www.poc.com.tw/en/about/about.html.

[77] Ibid., 4235-4236.

[78] Ibid., 4236.

[79] Costco Wholesale Corp. of the United States announced in 2016 that it would build a gas station in Taiwan, but it appears that it, too, would only buy oil products from CPC or FPC, rather than importing its own. See Shu We, Meng-ju Lin, Shu Min Wang, and Frances Huang, "Costco gas station seen unlikely to threaten competition," The Central News Agency website, accessed 7 January 2017, http://focustaiwan.tw/news/aeco/201609230007.aspx.

[80] All twelve overseas oil and gas-producing projects of OPIC listed on the Bureau of Energy 2013 Annual Report are joint ventures, with OPIC owning between five to 31% of the equity shares of them. See page 38 of the report.

[81] *Taiwan Petroleum Exploration 2011-2015 - Volume Eight*, 189. (Chapter Four – Exploration and Production of Overseas Exploration Blocks), CPC Exploration and Production Business Division website, accessed 8 January 2017 [台灣石油探勘紀要第八冊，第四章 國外礦區之探勘與開發].

[82] Of CPC's twelve oil and gas producing overseas blocks at the beginning 2013, nine of them were in the United States. See *Bureau of Energy, Ministry of Economic Affairs [ROC] 2012 Annual Report*, 38.

as it was implemented during the period studied and the ambiguity in the Mining Act on whether foreign firms were eligible to apply for onshore E&P pitted domestic private firms squarely against the NOC. The large capital requirement for upstream operations meant that so far only one domestic private firm, FPC, was competitive in this sector. Even without the edge CPC accrued from the sunset clause regarding offshore E&P, the huge technical and geopolitical complexities associated with hydrocarbon E&P off the coast of Taiwan were likely beyond the capability or interest of any domestic private firms.[83]

In the mid- and downstream sectors, as mentioned earlier, there were no restrictions for foreign participation since 2001. As of 2013, however, there had been scant interest in either sector. One reason the American Chamber of Commerce in Taipei put forward was the energy usage review for energy-guzzling facilitates, including oil refiners, required by the Energy Administration Act.[84] There were a relatively large number of domestic private firms in these sectors, but unsurprisingly not as refiners. As of the end of 2013, 204 companies obtained gas and diesel wholesaler licenses in Taiwan.[85] None of the 227 companies on the current Bureau of Energy list appears to be foreign companies, and this situation likely has remained the same since Esso's exit of the Taiwanese market.

In the retail sector, Taiwan had a total of 2,621 gas stations as of the end of 2013.[86] This number, as the number of oil product wholesalers quoted above, however, suggests more competition than there was in reality. Most of these gas stations were either CPC or FPC franchises. While CPC directly operated 633 of them,[87] FPC reportedly directly managed 133, with 525 affiliated entities. The remaining over 1,300 of service stations were CPC franchises.[88] The duopoly, therefore, continued.

The dominant domestic private oil firm FPC had become rather strong by 2013. In 2012, it ranked as the third largest "refining and marketing" oil firm in the world on the IHS Energy 50 list, only dropping to the fifth in 2013.[89] With a market capitalisation valued

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[83] Taiwan's offshore hydrocarbon E&P regions include areas of overlapping claims with China, South Korea, and Japan and have posed major hurdles in their development over the decades. There are more discussions of this issue later in the chapter.

[84] Yang, *et al*, *Research and Analysis of Investment Trends – Research on Taiwan's Strategies of Attracting Foreign Direct Investments*, 160. The Act was in the drafting stage in 2012 when the interview was conducted. The related stipulations, "Energy Development and Usage Evaluation Standards," [能源開發及使用評估準則] were finalised in 2015. The Chinese full texts of these stipulations see be seen on the Bureau of Energy, MoEA website, accessed 8 January 2017, https://www.moeaboe.gov.tw/ECW/populace/Law/Content.aspx?menu_id=2969.

[85] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2013 Annual Report*, 39.

[86] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2012 Annual Report*, 39.

[87] Ibid.

[88] "100 gas stations close on low demand over past year," The China Post, 31 May 2013. Accessed 6 January 2017, http://www.chinapost.com.tw/taiwan/national/national-news/2013/05/31/380009/100-gas.htm.

[89] "IHS Energy 50 – The Definitive Annual Ranking of the World's Largest Listed Energy Firms, January 2014."

at US$26.1 billion, the major criterion of the ranking, FPC did not rank within the world's top 50 energy firms.[90] Yet, it was bigger than a number of major Asian refining and marketing oil firms, including NOCs, such as SK Innovation of South Korea (ranked seventh), India Oil (ranked eighth), S-Oil of South Korea (ranked 10th), Tonengen Sekiyu of Japan (ranked 13th), and Bharat Petroleum of India (ranked 15th).[91] FPC was definitely a regionally significant petroleum player considering that Reliance of India was the only private Asian oil firm that made it on the overall top 50 list in 2013 if the subsidiaries of the Chinese "three barrels" are not counted.[92]

It is, however, not easy to accurately judge the relative "strength" of FPC versus that of CPC. CPC was not on the IHS list of top energy firms because it was not listed in any stock exchanges and therefore difficult to independently verify its size and financial situations.[93] The English version of CPC 2014 and 2013 annual reports do contain sections for financial statements which the company claimed to be compiling according to international accounting standards.[94] While CPC's "Total Liabilities and Equity" were about 80 percent higher than those of FPC in 2013 and 2012, its profit was less than one eighth that of FPC in 2013 and its loss was almost 14 times bigger than FPC's meagre profit in 2012 (all before tax).[95] In any event, the fact that the plausibility probe of this study finds that CPC controlled a little less than half of the crude oil supply to the economy in 2013 seems to suggest the two companies were more or less in parity around that time in isolation of other not as straightforward yardsticks.

What is certain is that state capital in the form of the vertically integrated NOC CPC was more tenacious and stronger in the petroleum sectors than in many other sectors

[90] The 50th on that list, TNK BP, had a market capitalisation of US$29.8 billion. Ibid.
[91] Ibid.
[92] These subsidiaries are categorised as "integrated NOC" on the list. Ibid.
[93] The other energy firms on the list that were classified as some form of "NOC" were traded in at least one stock exchange, such as Russia's Rosneft (in Moscow and London stock exchanges and ranked 14th), Colombia's Ecopetrol (in Bogota, New York, and Frankfurt stock exchanges and ranked 15th), and Norway's Statoil (in Oslo and New York exchanges and ranked 16th) in addition to the subsidiaries of the "three barrels."
[94] *CPC Corporation Annual Report 2014*, 39. In the 2013 annual report, the company only said the accounting was maintained "generally in accordance with the accounting laws and regulations governing state-owned enterprises [of the ROC]." *CPC Corporation Annual Report 2013*, 43. Interestingly, while this English annual report said if there were any discrepancies of the financial statements between the English and the Chinese versions, the latter "shall prevail." No financial statements whatsoever, however, are found in the Chinese annual reports at least between 2009 and 2013.
[95] CPC's huge loss and FPC's very small profit in 2012 apparently was due to the artificially low oil product price that year created by the government price stabilization effort that year. The calculation was done with figures in their annual reports in NT dollars. See *CPC Corporation Annual Report 2014*, 36 and 56; Formosa *Petrochemical Corporation and Subsidiaries Consolidated Financial Statements For the period from January 1. 2013 to December 31, 2013 and For the Period from January 1, 2012 to December 31, 2012 Report of Independent Auditors*, 4-5.

in the Taiwanese economy by 2013. Table 5.4 below provides important measures of state-owned enterprises' (SOEs) contribution to Taiwan's economy over the decades:[96]

Year	1951	1961	1971	1981	1991	2001	2005
% share of GDP	5.0	8.2	9.4	12.1	10.3	9.4	7.6
% share of domestic capital formation	24.2	16.2	20.4	30.1	21.5	12.1	10.2

Table 5.4 SOE Contribution to Taiwan's Economy 1951-2005

The impact of state generated capital to the overall economy has been waning, but probably not to the extent the table above seems to suggest.[97] After all, private capital in general was supposed to receive great institutional support in the last decade as confirmed by the high economic freedom and competitiveness scores Taiwan received in the years leading to 2013. SOE

Returning to the four-scenario framework to analyse the actor-specific source of Taiwan's international-domestic-state capital strength, around 2013 domestic private capital is stronger than international capital in the domestic market, especially in the petroleum sector, but still weaker than integrated IOCs in absolute terms. In any event, the lack of indigenous hydrocarbon resources and the intermittent state intervention in oil product pricing during the period studied, as well as a complex web of near-term and deep-rooted economic, political, and historical factors have mostly taken international capital out of picture, except as joint venture partners of state capital in offshore and overseas E&P.

Domestic private capital, in the form of the large oil refining and marketing firm FPC, is financially stronger or at parity with state capital. This would put Taiwan somewhere between scenario two of state "capture" and scenario three wherein state orientation counts the most. Both of these situations seemed to have played out at different times in different aspects of Taiwan's petroleum sectors in the two decades or so preceding 2013. Overall, private capital was strong in the oil refining and downstream sectors, but much less so in

[96] This table was simplified from the more detailed Table 1 on page 326 of Pao *et al*, "The road to liberalization: Policy design and implementation of Taiwan's privatization."

[97] One problem is the shifting definition of what is considered an SOE. By the count of the National Development Council, there are still seven wholly-owned SOEs or literally publicly-run enterprises [公營事業]. A performance report of SOEs or literally state-run enterprises 國營事業 produced by the Executive Yuan [Branch] in 2015, however, examined 17 SOEs, including all seven on the National Development Council website, as well as ones not on there, such as the Export-Import Bank of ROC and the Taoyuan Airport Corporation. In addition, there is a maze of hundreds of state partially but directly owned [直接投資] and "joint venture" [轉投資事業] companies which definitions are even murkier. For the Executive Yuan SOE performance report of 2015 [國營事業104年度工作考成總報告], accessed 10 January 2017, http://www.ndc.gov.tw/cp.aspx?n=E075FB75221AFC3A.
A U.S. International Trade Administration website counted 19 SOEs that were totally controlled by the "Taiwan authorities" as of 2015. See "Taiwan Country Commercial Guide," Export.gov, accessed 10 January 2017, https://www.export.gov/article?id=Taiwan-competition-from-state-owned-enterprises.

the upstream sector. Given the generally strong institutional and legal support private capital have had in the decade before 2013, it is not unreasonable to label domestic private capital as having a high strength versus state capital, especially in the petroleum sector. This explanatory variable, therefore, remains consistent with the stipulation of H3 upon closer scrutiny.

5. Taiwan's Trust in Oil Markets

This section explores in more depth Taiwanese decision-makers' overall level of trust in the oil markets' capability to ensure oil supply security to Taiwan's economy. This level was found to be high in the preliminary study, which is one of the conditions incongruent with the level stipulated by H3. This causal pathway to the adoption of a high level of strategic oil supply measures, as originally formulated, calls for a medium level of trust.

Initially, the same components of securitising agent and domestic and external securitising contexts are examined with content analyses using almost exactly the same terms as in the comparative studies in Chapter Four.[98] The sub-sections below, each corresponding to one component proposed to make up states' overall trust level in relying on the oil markets for their economies' oil supply, show that Taiwan's overall trust level only comes to a medium, not high.

5.1 Taiwan's Securitising Agents

The "traditional" and vertically integrated NOC of CPC earned a low trust score for Taiwan in the preliminary study as it is hypothesised to act as a powerful securitising or lobbying agent against solely relying on the market for oil supply. The 2010 to 2014 Chinese annual reports of CPC, which provide information of the company from 2009 to 2013, are analysed to understand the extent of its securitising.

CPC engaged in moderate securitising during the five years studied by this measure alone. It has an overall five-year average score of 22.8, higher than Chinese NOCs' two-year average Chinese annual reports of 14, but considerably lower than India's five-year average of 37.2 and Thailand's 34.8.[99] This is unsurprising considering that CPC had both operational as well as sector administration functions. While the company acted as a vehicle of implementing the state's oil supply policies, its executives would have direct inputs into the formulation of the policies, even if they were not the final decision-makers.[100]

[98] The Chinese terms used are adjusted slightly to reflect the common language usage in Taiwan (versus that in Mainland China), but the substantive meanings of them are the same.
[99] See Table 16, Appendix D for the breakdown of scores of all four economies.
[100] The decision-makers would be officials at the Bureau of Energy at the MoEA, higher officials at the Executive Yuan, and ultimately, elected members of the Legislative Yuan.

This would reduce the need to engage in securitising via annual reports, at least towards decision-makers if not the public.

In addition, the privatisation of CPC and oil sector liberalisation had been declared the ultimate goals by the state at least since 2001. The company is supposed to function as efficiently as possible in preparation for the public offering of its shares.[101] As sector administrator, the company at least had to pay lip service to these goals. This may explain the only pertinent usages of the term "strategic" in the CPC annual reports analysed were describing CPC's continuous overseas E&P effort as part of its "strategic arrangements."[102]

Instead, since encouraging "self-developed" hydrocarbon resources by Taiwanese firms has been the official policy, (regardless if they are state- or privately owned), CPC's efforts or achievements in this area were emphasised in the annual reports.[103] Emphasis on having "self-developed" or "self-owned" oil appears to be a manifestation of a lack of trust in the functioning of the market. It is because, as discussed in Chapter Two, many economists believe it does not really matter which firms or countries develop the resources as they would all go in the big supply pool or "bathtub" that is the international oil market.[104] The sector administrator role of CPC, however, makes it difficult to tease out whether the application of these terms in its annual reports is a reflection of its attempt at or a result of its securitising. In reality, it is likely to be both and the two would continue to "chase" each other in a circle until some exogenous factor breaks it up.

Since the labour union of CPC has been a major stumbling block for CPC's privatisation, it is reasonable to investigate if the union has acted as an agent securitising oil supply to strengthen their argument against CPC's privatisation.[105] A random sampling of the publication of the union, *Oil Workers* [石油勞工], between 2002 and 2013 online shows numerous articles in each issue on the various pitfalls of privatisation of SOEs.[106] Only one article was found to specifically put forward the detrimental effects of privatisation on the economy's oil supply security. This piece appearing in the publication's first issue predicted Taiwan's economic collapse due to volatile oil prices that would change according to

[101] The 2001 "Privatization Plan" proposes to look for strategic investors or to publicly offer shares of the company to accomplish CPC's privatization. See "Achievements of Privatization," National Development Council website.
[102] The same reference was made once in each of the five annual reports analysed.
[103] The terms "self-developed" [自主] or "self-owned" [自有] are searched and analysed in addition to "self-sufficiency" or "self-reliance" analysed in economies in the comparative studies since these terms are used in other Taiwan government documents and that it had almost no indigenous oil resources in the period studied. While the latter terms were not used at all in the annual reports, the first two terms score the highest among all the terms analysed.
[104] Nordhaus, "The Economics of an Integrated World Oil Market," 2.
[105] Although it is the labour union of CPC, it has a deceivingly inclusive name of "Taiwan Petroleum Union" [臺灣石油工會].
[106] All issues between March 2002 to December 2016 are available online. Accessed 20 January 2017, http://tpwu.org.tw/oil-workers.html.

fluctuations in the international oil markets.[107] If foreign corporation(s) control CPC after the public offering of its shares, FPC could hardly match these corporations' prowess and would soon be squeezed out of the market. This in turn would lead to mass unemployment and the domestic oil market will be controlled by outsiders, possibly even foreign governments that back the foreign corporations.[108]

These scare tactics of the union may be too crude to securitise decision-makers, but their impact on the workaday voters in Taiwan is more difficult to gauge. Under Taiwan's democratised political system in the last decade, decision-makers have to take voter opinions seriously. The repeated reference to foreign corporations and their possible government backers may also hit a nerve of the diplomatically isolated and strategically vulnerable Taiwanese people.

The results of the content analysis presented in this sub-section show that both CPC and its labour union did act as securitising agents of Taiwan's oil supply, if not as coherently or powerfully as they could have been. The sector administrator role of CPC would have provided it more direct channels of securitisation, while its executives may also be walking a tight rope in balancing its securitisation effort with its attractiveness to investors when its overdue privatisation finally happens. These two most obvious oil supply securitising agents of Taiwan did not lead to a low trust in the oil markets, judging by their public effort investigated here. Taiwan, therefore, earns more a middle rather than a low score for this component making up its overall trust level.

5.2 Taiwan's Domestic Context of Trust

According to the vulnerability-interaction model, Taiwan should have a high level of trust in private enterprises supplying oil in the domestic market without any artificial price intervention. Taiwan's per capita GPD in 2013 suggests that its population as a whole was sufficiently well-off that fluctuations in oil product prices in a free market should not be detrimental to its basic livelihood.[109] Taiwan's populace was also relatively urbanised, although not as highly as Singapore, Japan, South Korea or some other economies in the

[107] Lin Ching-lang, "Our Country's Energy Policy," *Oil Workers* Vol. 344 (March 2002) [林清朗, 我國的能源政策, 石油勞工]. Accessed 22 January 2017, http://tpwu.org.tw/oil-workers/193-article-344/8430----------29.html.
[108] Ibid.
[109] It had the second highest per-capita GDP among the nine case-study economies in 2013, after Singapore. See Table 3.8 in Chapter Three. It ranked the 30th worldwide and the fourth among Asia-Pacific economies according to the U.S. Central Intelligence Agency (CIA). The three in the region ahead of Taiwan are all city-size economies: Macau, Singapore, and Hong Kong. See "Country Comparison : GDP Per Capita (PPP)," CIA website, accessed 22 January 2017, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html.

Asia-Pacific.[110] The reasoning of the vulnerability-interaction model is that the more geographically concentrated the population is, the fewer people would be left underserved by private oil companies not wanting to extend their supply routes too far due to profit consideration.

As in the comparative studies developed in the Chapter Three, the GINI index reading of Taiwan is examined to give a more detailed picture of the evenness of its economic development. Taiwan's GINI Index score was 33.6 in 2014, [111] which is lower than China, India, or Thailand's scores. [112] This means Taiwan's domestic income was more equally distributed than these economies. Against such a domestic context, it is argued that it would be more difficult for CPC or other securitising agents to convincingly lobby for CPC's importance in ensuring the basic oil needs of poor and rural residents.

In reality, while formally "liberalising" the domestic oil market, the Taiwanese government also set up a petroleum fund to provide subsidies to cover the difference in transportation costs and wages for operators which supply oil products to indigenous mountainous areas and outlying islands with the Petroleum Administration Act in 2001[113] Since then, nine amendments to the details of subsidies were promulgated up to 2013.[114] The August 2010 amendment expanded to make residents living in these places eligible for subsidies to be supplied with liquefied petroleum gas (LPG) cylinders.[115] In early 2011, the MoEA also added fishing boat operators, farmers, rehabilitation and public transportation buses, taxi cabs on the list of eligible subsidy recipients.[116]

These subsidies theoretically should take care of the basic oil needs of vulnerable and underserved residents without interfering in oil product pricing or even having an NOC. All operators may apply for the subsidies as long as they engage in oil supply to the relevant

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[110] See Table 3.8 in Chapter Three. According to the World Bank data, Taiwan's 70 urbanization rate in 2013 was also lower than Malaysia's 73 and Brunei's 76 in the region even if Australia and New Zealand or other city-size economies are not counted.

[111] "Country Comparison: Distribution of Family Income – GINI Index," CIA website, accessed 22 January 2017, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2172rank.html.

[112] The scores of China, India, Thailand on the same list are 46.9, 33.6 (same as Taiwan), and 48.4 respectively. Note that India's reading from the World Bank is slightly higher than Taiwan. See footnote 77 in Chapter Three.

[113] For details of who and what these subsidies cover and how to apply for them, see the latest version (promulgated on 29 April 2014) of "Petroleum Fund Reward and Subsidies," Bureau of Energy, MoEA website [經濟部能源局 石油基金補助山地鄉及離島地區石油設施與運輸費用及差價補貼申請作業要點]. Accessed 22 January 2017, http://web3.moeaboe.gov.tw/ECW/populace/Law/Content.aspx?menu_id=631.

[114] Ibid.

[115] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2011 Annual Report*, 35.

[116] "Oil price subsidy in store for underprivileged consumers," *The China Post*, 20 April 2011. Accessed 15 January 2017, http://www.chinapost.com.tw/taiwan/national/national-news/2011/04/20/299311/Oil-price.htm.

areas or sectors.[117] As of the end of 2011, 26,469 households applied for the LPG cylinder subsidies, but no operator applied for subsidies to set up new oil supply facilities (such as gas station) in indigenous mountainous areas.[118] Only one operator applied for subsidy to expand facilities in these areas, and the highest number of applications was to cover wage difference, but even that only involved 12 gas stations.[119]

The less than enthusiastic response to this market-conforming measure may mean that the subsidies do not actually cover the additional costs of supplying oil to these areas or sectors.[120] In reality, there have been only two suppliers at the wholesale level, which is not conducive to competitive pricing. In the meantime, the government still felt the need from time to time to adopt the market-displacing measure of "stabilising" oil product prices across the board by having the CPC selling gasoline and diesel below costs. This appears to indicate a very risk-averse attitude in the part of the Taiwanese government. Has the CPC been specifically securitising its role in the domestic oil market to contribute to this risk aversion?

The CPC did mention in each of its five annual reports analysed that it was "intent on making people's life more convenient and prosperous," and it "satisfies the oil product needs of civilians and the military in remote areas without regard to the losses incurred."[121] Other than that, however, it did not seem to go too far beyond the "usual" corporate social responsibility speech of "helping underprivileged groups and participating in community benefit activities,"[122] or "while pursuing profits, still attending to other issues such as social justice, underprivileged groups, safety and health, community development, and environmental protection."[123] Even this "cosmetic" lobbying, of course, is considerably more than what Chinese NOCs said in their annual reports of the same period.[124]

If CPC did not trump up the role it played in oil domestic distribution too robustly, there must be other factors that contributed to the Taiwanese government's disproportional aversion to oil price fluctuations and affordability. This is especially true considering the relatively high objective economic and developmental level Taiwan has achieved in the last two decades. The CPC labour union did trumpet the role played by CPC boisterously, but

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[117] The Bureau of Energy of "Petroleum Fund Reward and Subsidies" website above listed 42 rural counties or townships and six outlying islands.
[118] *Bureau of Energy, Ministry of Economic Affairs [ROC] 2012 Annual Report*, 42.
[119] Ibid.
[120] Different formulae of how to calculate different types of subsidies are listed in the Bureau of Energy website cited earlier.
[121] *CPC Corporation 2014 Annual Report*, 5.
[122] *CPC Corporation 2013 Annual Report*, 7.
[123] *CPC Corporation 2012 Annual Report*, 5.
[124] FPC's 2014 Chinese annual report contains a similar level of this type of CSR speech, such as helping underprivileged groups, but FPC did not mention oil supply to remote areas or things like social justice.

not too frequently. Two established think tanks in Taiwan appear to consistently "defend" the role played by the CPC, if not direct state intervention in oil pricing. One of the proposals the Taiwan Institute of Economic Research (TIER) put forward to improve the floating oil price formulation in 2013, upon the request of the MoEA, emphasised CPC's social responsibility for stabilising domestic fuel prices.[125]

In a report titled "Key Report on Floating Oil Price Mechanism," the CTCI Foundation detailed the evolution of Taiwan's oil pricing system and the controversies of its implementation in the last two decades.[126] The report was a thinly-veiled endorsement of how CPC handled the whole situation under difficult circumstances. It suffered losses in executing the government's oil stabilisation program when the international oil price was high and was being unfairly accused of not lowering oil prices enough when international oil price was coming down.[127]

The TIER and the CTCI both have deep and entangling connections with the KMT and hence the CPC. The TIER was founded by the prominent Taiwanese entrepreneur-diplomat Koo Chen-fu [辜振甫] in 1976 as Taiwan's "first private independent think tank."[128] CTCI was originally set up in 1959 as China Technical Consultants, Inc.[129] In 1979, CTIC was split into a for-profit engineering service company, which has provided many services to CPC, and a non-profit foundation in the areas of energy and environmental

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[125] The Chinese name of this think tank is 台灣經濟研究院 or more commonly simply known as 台經院. In English reporting, its English name sometimes is confused with another established, but very different think tank, the Taiwan Research Institute, which Chinese name is 臺灣綜合研究院 or simply 臺綜院. The following is an example of such mistaken reporting. The English and the Chinese names given in the piece do not match. According to numerous Chinese media reports on the same event, it was in fact the Taiwan Institute of Economic Research, NOT the Taiwan Research Institute that made a proposal that emphasised CPC's social responsibility in stabilising oil price. See "Institute proposes amendment to CPC floating oil price model," *The China Post*, 29 March 2013. Accessed 20 January 2017, http://www.chinapost.com.tw/taiwan-business/2013/03/29/374515/Institute-proposes.htm.

[126][浮動油價機制的關鍵報告 2016-1]. In fact, although no individual author is listed on the report's cover, the inside cover page said the report was mainly written by retired CPC General Manager Lin Mao-wen. The names of three editors were also listed.

[127] Ibid.

[128] "Background," TIER website. Accessed 22 January 2017, http://english.tier.org.tw/eng_about/background.asp. For the deep and tangled relationship between Chen-fu Koo, and indeed the whole Koo family and the KMT, see Tsai-man C. Ho, "The case of the Koo family in Taiwan," in *Rethinking Social Capital and Entrepreneurship in Greater China – Is guanxi still important?* Ed. Jenn-Hwan Wang and Ray-May Hsung (Oxon, UK: Routledge, 2016), 75-94.

[129] "About Us," CTCI Foundation website. Accessed 24 January 2017, http://www.ctci.org.tw/ct.asp?xItem=2434&CtNode=526.
CTCI is allegedly one of the KMT-sponsored companies and has been funded by both the MoEA and later profit from CTCI Corporation. See Ouyang Yi, "CTCI Corporation's biggest Shareholder, CTCI Foundation Has Deep Connection With Siew," Liberty Times, 7 June 2009. Accessed 24 January 2017 [歐祥義， 中鼎最大股東 中技社與蕭淵源深], http://news.ltn.com.tw/news/focus/paper/309342.

policy.[130] Yet, these two "pro-CPC" think tanks did not defend state intervention in oil prices without reservation. The second proposal TIER submitted to the MoEA called for increasing the range of oil price changes by CPC from 80 percent to 100 percent of actual fluctuations in international oil prices.[131] In its concluding remarks, the CTCI report says Taiwan should learn from economies such as United States, Japan, South Korea, Singapore, Hong Kong, and the Philippines wherein oil product prices are freely determined by various oil companies.[132]

At the end of the day, it appears to be populist pressure in a newly democratised political entity that was the major cause of bouts of direct state intervention in oil product pricing in Taiwan up to 2013. CPC began adopting the floating oil mechanism in January 2007, three months after the MoEA announcement of the pilot scheme. Due to rising prices in the international markets, the Executive Yuan (Council), under the leadership of the Democratic Progressive Party (DPP) at the time, decreed to lower maximum price increase from 15 percent to 12 percent in November of that year.[133] This was a critical time in the democratic development of Taiwan as the Legislative Yuan election was coming up in January 2008 and the fourth openly contested presidential election in the history of Taiwan would take place in March. The incumbent DPP president was not doing well and suppressing domestic oil price hike would be an easy "electorate pleaser."[134]

With mounting losses due to continuously rising international prices, CPC requested to increase the domestic oil prices on 1 January 2008, but the Executive Yuan deferred the decision- making to after the elections. Even after the DPP lost both elections by the end of March, the Executive Yuan refused to "make such a major decision as it had become a caretaker cabinet." The oil price freeze was finally lifted by the new Premier of the Executive Yuan on 27 May after KMT assumed the presidency.[135]

Between May 2008 and December 2010, gasoline and diesel prices were mostly free-floating, with very brief interference such as a couple of weeks of smaller diesel price

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[130] "Key Report on Floating Oil Price Mechanism," inside cover. For some of the major service contracts CTCI got from CPC, see "CTIC Corporation Successfully Obtains EPC Turnkey Project of CPC Linyuan Petrochemical Plant's No.6 Naphtha Cracker Plant," CTCI website, August 2009. Accessed 24 January 2017 [中鼎成功取得中油林園石化廠第六輕油裂解工場 EPC 統包工程], http://www.ctci.com.tw/WWW/CTCI/news%20database/news-2009-08-2.htm.

[131] See "Institute proposes amendment to CPC floating oil price model，" *The China Post*. Also see Kuo Yi-kun and Hsieh Chin-hui, "Floating Oil Price Formula Revisions Will be Submitted to MoEA in May," *Independent Evening Post*, 4 April 2013. Accessed 24 January 2017 [郭宜均/謝錦慧, 浮動油價公式修正 5 月報經部, 自立晚報], http://www.idn.com.tw/news/news_content.php?artid=20130404abcd012.

[132] "Key Report on Floating Oil Price Mechanism," 129.

[133] "Key Report on Floating Oil Price Mechanism," 15.

[134] For a concise timeline of the 2008 election and its significance, see Kerry Dumbaugh, "Taiwan's 2008 Presidential Election," *CRS Report for Congress RS22853*, April 2, 2008.

[135] "Key Report on Floating Oil Price Mechanism," 15; Dumbaugh, "Taiwan's 2008 Presidential Election," 1.

hike in the aftermath of typhoon attacks or price freeze during lunar new-year holidays.[136] Then before campaigning began for the first concurrent legislative and presidential elections in January 2012, the CPC adopted the policy of only raising domestic oil prices half that of international price hike to "coordinate with the oil and gas price freeze resolution" in the Legislative Yuan, controlled by KMT at the time.[137] Ostensibly by November 2010, CPC had accumulated a surplus that was over the "statutory limit."[138] Almost like clockwork, however, the government allowed gasoline and diesel prices to resume hiking more in tandem with international prices in April 2012, soon after the KMT-majority legislature and the KMT president were reelected.[139]

The formula used to calculate the prices in the "floating" oil pricing mechanism generated many negative commentaries and public sentiments and so was repeatedly adjusted.[140] That led the MoEA to ask two different think tanks, TIER and Taiwan Research Institute as mentioned earlier, to study and make recommendations to the whole oil price pricing mechanism in early 2013. At a symposium related to these studies held in April 2013, a number of independent scholars voiced the opinion that unless the CPC is totally privatised and more competition entered the domestic market, whatever pricing formula the MoEA derived would be criticised and not be accepted by all the people.[141]

More surprisingly due to the politicised status of CPC and oil pricing policies, and hence probably more convincingly, a legislator from the opposition DPP made the following diagnosis at the symposium. "Taiwan [people] has a very low tolerance in high oil prices…in the previous few years, CPC and Taipower [state-owned power company] were profitable and their prices did not float either, but the people did not complain at the time because they had comfortable lives at the time."[142]

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[136] "Key Report on Floating Oil Price Mechanism," 16.
[137] Ibid. Also see Jacques deLisle, "Taiwan's 2012 Presidential and Legislative Elections: Winners, Losers, and Implications," *Foreign Policy Research Institute E-Notes*, January 2012. Accessed 24 January 2017, http://www.fpri.org/docs/media/201201.delisle.taiwan.pdf.
[138] "Key Report on Floating Oil Price Mechanism," 16. No mentioning of any "statutory limit" on CPC's surplus is found in the Petroleum Administrative Act, but it is possible that it is stipulated in other administrative documents governing CPC operation.
[139] Ibid. Also see deLisle and *CPC Corporation 2012 Annual Report*, 4. As detailed in footnote 18, the actual policy is rather complicated, which is called "rationalisation," which tried to let CPC recuperate losses incurred in the previous few months. It was met with such strong public condemnation that it was suspended very soon and was only resumed in October 2013.
[140] A major point of contention was that CPC was allowed to reduce oil prices by 50% of international price fall to recuperate the losses it incurred previously. See footnote 18 for more details for both the price "stabilisation" and the subsequent "rationalisation" policies.
[141] Kuo Yi-kun and Hsieh Chin-hui, "Floating Oil Mechanism Experiences Six Adjustments," *Independent Evening Post*, 4 April 2013. Accessed 24 January 2017, [郭宜均/謝錦慧, 機制經歷六次調整, 自立晚報], http://www.idn.com.tw/news/news_content.php?artid=20130404abcd012.
[142] Ibid. The legislator is Huang Wei-che [黃偉哲]. See his biography at the Legislature website, accessed 24 January 2017, http://www.ly.gov.tw/03_leg/0301_main/legIntro.action?lgno=00076&stage=9.

This low tolerance to high oil prices was made more problematic "against the backdrop of bitter partisan battles, ideological polarisation and shaky governance" while Taiwan was still undergoing the transition to a mature democracy.[143] Its electorate was "highly engaged, with a 'vibrant election culture' manifest in high levels of citizen interest, knowledge and participation" compared to those in consolidated democracies.[144] Taiwan's equally vibrant media also helped fan the flames of populist demands on low oil prices. Two decades after the lifting of martial law in 1987,[145] the Taiwanese media was described as transforming from a "lapdog to mad dog."[146]

At the same time, while still more equal than some other Asian economies as shown earlier, "economic inequalities increased markedly" in the period between 2008 and 2011 when the KMT government allowed oil prices to run free.[147] During the 2012 presidential campaign, the DPP exploited quality of life issues such as income disparity and unemployment. There is little wonder that the incumbent KMT government (both the legislative and the executive branches) adopted the defensive tactic of temporarily freezing oil prices during the campaign season.

Some may understand the Taiwanese government's interference in oil pricing in the years leading to 2013 as a rational political move which had nothing to do with trust in the domestic oil market's capability to reliably supply affordable oil to the economy. Yet, the concern that high oil prices would have a sufficiently negative impact on the lives of the electorate to sway election results is a manifestation of decision-makers' risk preference being lowered probably from "risk neutral" to "risk averse." As discussed in Chapter Two, this study adopts a behavioural definition of trust which involves *both* the belief of the trustworthiness of the object of trust and the willingness to accept the risks of performing the trusting act. Taiwan decision-makers apparently did not trust the free market enough (or was risk averse) to perform the trusting act of letting domestic oil product prices float in a

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This low tolerance might be "nurtured" by the fact that Taiwan had had the lowest oil product prices among a number of neighbouring economies, such as Japan, South Korea, and Hong Kong. See "Key Report on Floating Oil Price Mechanism,"19 and 29.

[143] Jonathan Sullivan, "Taiwan's 2012 Presidential Election," *Political Studies Review* Vol. 11 (2013), 66. Although the wave of populism that has swept through the so-called "consolidated democracies" in Europe and the United States since 2013 shows that the distinction is debatable.

[144] Ibid.

[145] The martial law was in imposed by Chiang Kai-shek in 1949 and it banned political parties other than the KMT, imposed heavy censorship, and empowered military courts to convict civilians of "sedition and other crimes." See "Taiwan Ends 4 Decades of Martial Law," *The New York Times*, 15 July 1987. Accessed 1 March 2017, http://www.nytimes.com/1987/07/15/world/taiwan-ends-4-decades-of-martial-law.html.

[146] Mark Magnier, "They Can't Handle the Truth," *Los Angeles Times*, 28 February 2005. Accessed 1 February 2017, http://articles.latimes.com/2005/feb/28/world/fg-hounds28.

[147] Ibid., 69.

totally unfettered at all times in the years leading to 2013, regardless of the degree of the decision being rational calculation.

The declared objectives of privatising CPC and liberalising oil pricing by decision-makers of both major political parties suggest that most of them believed that a domestic oil market with minimal state intervention was ultimately correct policy direction. The same decision-makers, however, seemed to be unwilling to accept the risks of trusting the domestic market to supply affordable enough oil to the people in the high oil price years leading to 2013, especially during the critical election season. The existing duopolistic domestic oil market and the low tolerance of high oil prices by the people in Taiwan, therefore, more than Taiwan's highly developed economy, served as the pertinent domestic context. This situation lowered the state's willingness to accept the risk of fluctuating availability and prices that would come with the open market system. Indeed, the concern of stable supply of oil products and natural gas in the domestic market after CPC privatisation was raised in the National Development Council report on the SOE privatisation, which appears to be bipartisan.[148] The most pertinent domestic context to Taiwan's decision-makers, therefore, at best led to a medium trust in a totally free domestic oil market circa 2013.

5.3 Taiwan's External Securitising Context

In this category, Taiwan receives a high score for its relationship with the United States in the preliminary study. The vulnerability-interaction model hypothesises that such an external context can hardly be exploited to securitise the untrustworthiness of the international oil markets. The United States had the capability to underwrite the stability of the system upon these markets have rested, especially the freedom of navigation in international waters along major maritime oil shipping routes to the Asia- Pacific. Up to 2013, it also appeared to have the willingness to take actions when the need arose, such as when Iran threatened to close the Strait of Hormuz in 2012.[149] Being an ally of the United

[148] The observation of this being a bipartisan concern is based on the fact that the report was supposed to be last updated on 31 December 2016, almost a year into the DPP administration. The National Development Council is a "major policy planning organization" under the Executive Branch. See "Vision, Mission, and Policy Direction" National Development Council website [願景、使命與施政方向, 國家發展委員會]. Accessed 5 February 2017, http://www.ndc.gov.tw/cp.aspx?n=7F220D7E656BE749&s=5C3F3ED6E0AA4055.

[149] U.S. warships were the leading forces to prevent the Iranian threats from materialising. See Elisabeth Bumiller, Eric Schmitt, and Thom Shanker, "U.S. Sends Top Iranian Leader a Warning on Strait Threat," *New York Times*, 12 January 2012. Accessed 25 January 2017, http://www.nytimes.com/2012/01/13/world/middleeast/us-warns-top-iran-leader-not-to-shut-strait-of-hormuz.html. Also see David Blair, "Britain, US and France send warships through Strait of Hormuz," The Telegraph, 23 January 2012. Accessed 25 January 2017, http://www.telegraph.co.uk/news/worldnews/middleeast/iran/9031392/Britain-US-and-France-send-warships-through-Strait-of-Hormuz.html.

States, a polity would expect that the powerful American capability is unlikely be used against its own core interests while it enjoys the public goods of unimpeded shipping and transactions associated with oil and other types of international trade.

The high trichotomous score is generally given to a formal and, in the case of Taiwan, de facto U.S. ally in the preliminary study. This section investigates the extent Taiwan's relationship with the United States in the decade leading to 2013 would make securitising solely relying on private firms and the international oil markets for Taiwan's oil supply largely irrelevant. It also examines if there were other pertinent external factors that could easily be exploited by interested parties to securitise the role the Taiwanese government could or should play in the oil supply to the economy.

Taiwan has not been a formal ally of the United States since 1979 and the U.S. commitment of protection against coercion and arms sales to the island has been conditioned and ambiguous.[150] The commitment has been contingent on "no unilateral statements or actions" that change the status quo of Taiwan by either Taiwan or China.[151] This ambiguity not only stems from what constitutes "status quo" as defined by the United States,[152] but also what actions exactly it would perform. The U.S. Assistant Secretary of Defense Joseph Nye reportedly responded to Chinese queries on hypothetical attack on the island during the 1995-1996 Taiwan Strait Crisis by observing that, "we don't know what we would do, because it's going to depend on the circumstances, and you don't know what we would do."[153]

One would expect this strategic ambiguity pursued by the United States and the increasing economic and military capabilities of China over the last two few decades to heighten Taiwan's threat perceptions. If that was the case, it would be an external context that facilitates interested parties' efforts to securitise oil supply to Taiwan since oil has traditionally been portrayed as a strategic resource, critically needed during wartime. Besides, most of the oil supply to Taiwan had to be shipped past the coast of Southern China before reaching Taiwan. In the event of a Chinese blockade of the Taiwan Strait, oil supply to the island would be interrupted, if not completely severed.

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[150] After the termination of the 1954 mutual defense treaty in 1979, the Taiwan Relations Act and the "six assurances" by President Reagan in 1982 together form an "informal, quasi-alliance" between the United States and Taiwan. See Wang Yuan-kang, "Taiwan Public Opinion on Cross-Strait Security Issues – Implications for US Foreign Policy," *Strategic Studies Quarterly* 7-2 (2013): 96. Also see Scott L. Kastner, "Ambiguity, Economic Interdependence, and the U.S. Strategic Dilemma in the Taiwan Strait," *Journal of Contemporary China* 15-49 (2006), 654-662.

[151] James A. Kelly, "Overview of U.S. Policy Toward Taiwan," 21 April 2004, U.S. State Department website. Accessed 1 February 2017, https://2001-2009.state.gov/p/eap/rls/rm/2004/31649.htm.

[152] One of the "core principles" of the U.S. policy towards Taiwan listed in the testimony above reads, "…unilateral moves that would change the status quo as we define it." Ibid.

[153] Kastner, "Ambiguity, Economic Interdependence, and the U.S. Strategic Dilemma in the Taiwan Strait," 652.

In reality, Taiwan's threat perceptions, while somewhat fluctuating, generally trended downward in the last two decades.[154] According to polls by various organizations over recent years, most Taiwanese were mindful of the military might of China and lacked confidence in their own defence capability at the same time.[155] Yet, the majority of those polled did not think China would launch attacks against the island in the near future, especially if Taiwan does not declare independence from China.[156] The softening of China's posture towards Taiwan after the U.S. and Taiwanese politico-strategic blowback resulting from its belligerence during the 1995-1996 Taiwan Strait Crisis and an improved understanding on the part of Taiwanese leaders of "China's red-lines" relative to limiting Taiwan's prerogative to declare its independence may partially explain this apparent paradox.[157]

The real reason of the lowering threat perceptions, however, seems to lie in the Taiwanese public's increasing confidence that the United States would come to Taiwan's rescue against unprovoked Chinese attacks, or even if Taiwan were to declare its independence.[158] Forty-seven point five percent of survey respondents in 2003 and 56.4% in 2011 said "yes" to this hypothetical question on a Taiwanese declaration of independence. This confidence shot up to 73.5 percent in 2011 "if the attack is unprovoked," meaning Taiwan maintaining the status quo.[159] Regardless whether or not this confidence was misplaced, it appears that the United States sending two aircraft carrier groups to the Taiwan Strait during the 1995-96 crisis was the turning point in Taiwanese public perceptions.[160]

Independent observers have not reached a consensus over whether Taiwan's political elites and decision-makers shared this lowered threat perception with the general

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[154] See for example, Arthur S. Ding and Paul A. Huang, "Taiwan's Paradoxical Perceptions of the Chinese Military," *China Perspective* [online], 2012/4/2011. Accessed 1 February 2017, http://chinaperspectives.revues.org/5742. Also see Ronan Tse-min Fu, "Threat Perception, Power Asymmetry, and Alliance: Explaining Taiwan's Declining Military Expenditures," (paper presented at the International Studies Association Conference, Hong Kong, 25-27 June 2016). Accessed 1 February 2017, http://web.isanet.org/Web/Conferences/AP%20Hong%20Kong%202016/Archive/a258144d-9d26-427f-974c-f7111f99faea.pdf.
This does not mean that Taiwan's threat perceptions were actually low as those perceptions started from a very high level during the martial law period. Ronan Tse-min Fu classified it as "modest" in his study.

[155] Fu, "Threat Perception, Power Asymmetry, and Alliance: Explaining Taiwan's Declining Military Expenditures," 18-20.

[156] Ibid., 20.

[157] Especially after Hu Jintao assumed the leadership of the Chinese Communist Party in 2002 and adopted a more patient and conciliatory approach towards Taiwan. See Ding and Huang, "Taiwan's Paradoxical Perceptions of the Chinese Military," 45-46; 50.

[158] Wang Yuan-kang, "Taiwan Public Opinion on Cross-Strait Security Issues – Implications for US Foreign Policy," 98.

[159] Ibid.

[160] Fu, "Threat Perception, Power Asymmetry, and Alliance: Explaining Taiwan's Declining Military Expenditures," 24.

public.[161] In any event, Taiwanese public opinion is "malleable and constantly shifting."[162] Taiwanese leaders, moreover, understood that as long as China did not renounce the use of force as an option to eventually "reunite" with Taiwan, the threat to Taiwan's long-term security remained. Arthur S. Ding and Paul A. Huang describe this situation as "a major contrast between long-term threat and short-term stability in cross-Strait relations."[163]

This long-term strategic threat always loomed at least in the background. The thawing of U.S.-China relationship in the early 1970s, eventually leading to the "status quo" of Taiwan seriously restricted Taiwan's international manoeuvring space. China continued (and still continues beyond 2013) to block or manipulate Taiwan's participation in international meetings or organizations, apparently in accordance with the level of "obeisance" by Taiwanese leaders. The saga of China blocking Taiwan's participation in the World Health Organization (WHO) activities during the pro-independence DPP presidency years (2000 – 2008) and "letting" Taiwan attending the annual World Health Assembly of the WHO in 2009, after the KMT president was elected was a recent prominent example of Beijing's carrot-or-stick strategy directed towards Taipei.[164]

The only international energy organization Taiwan was able to participate in was the APEC Energy Working Group, comprising of 21 Asian Pacific economies, including China and the United States, as long as it was being referred to as "Chinese Taipei" and an "economy" rather than a country.[165] China used such nomenclatures to rein in Taiwan's independence aspirations, as well as to pressure other states not to have any dealings with a Taiwanese "state" on a pro forma basis even in domains not traditionally associated with high politics, such as health care and energy cooperation. The United States, eager to maintain its posture of strategic ambiguity in the Taiwan Strait, often complied with the rules of this Chinese-induced naming game.[166]

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[161] Fu cited Taiwanese defence officials saying it was highly unlikely that China would attack Taiwan. "Threat Perception, Power Asymmetry, and Alliance: Explaining Taiwan's Declining Military Expenditures," 20-21. Yuan-kang Wang and Ding and Huang seem more sceptical. See "Taiwan Public Opinion on Cross-Strait Security Issues – Implications for US Foreign Policy," 108; and "Taiwan's Paradoxical Perceptions of the Chinese Military," 50-51.

[162] Yuan-kang Wang, "Taiwan Public Opinion on Cross-Strait Security Issues – Implications for US Foreign Policy," 108

[163] "Taiwan's Paradoxical Perceptions of the Chinese Military," 43.

[164] An internal WHO memo was leaked to the press in 2011 which shows the WHO had "arrangement with China" that governs the procedures WHO was to interact with Taiwan. See Bonnie S. Glaser, *Taiwan's Quest for Greater Participation in the International Community* (New York: Rowman & Littlefield, 2013), 17. Also see Czeslaw Tubilewicz, "Friends, Enemies or Frenemies? China-Taiwan Discord in the World Health Organization and Its Significance," *Pacific Affairs* 85-4 (December 2012): 701-722.

[165] *International Energy – International Forums Contribute to Energy Cooperation within Constraints* (Washington D.C.: United States Government Accountability Office, December 2006), 10-11.

[166] The U.S. Department of Energy, for example, in its comments on the draft of the report in footnote 165 suggests the energy consumption amounts of "countries" featured in a graph in the report be

Apart from constricting Taiwan's manoeuvring space in the international arena, China has also become a major player in Taiwan's economic well-being in the last two decades. By 2002, China had replaced the United States as Taiwan's number one export market,[167] and absorbed between 21 (excluding Hong Kong) and 40 percent of Taiwan's export in 2012.[168] Taiwan's petrochemical industry, with surplus capacity for the domestic market resulting from transformation of the island's economy from one dominated by labour intensive light industries to technology products, exported 55% of its products to China.[169]

China also became the top destination of Taiwan's outbound FDI and production base for many of Taiwan's information technology product exports, including the infamous Foxconn factory for Apple products.[170] Taiwan restricted Chinese investments on the island due to security concerns, which have only been gradually eased since 2009.[171] This partly explains the over 100 times larger amount of Taiwanese investments in China than the other way round during the period studied.[172] In short, as much as the Taiwanese government tried to "strike a balance between growth and security," the economy inevitably developed an

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increased so that Taiwan would not make it to the graph, presumably to avoid embarrassment. Ibid., 56-57.

[167] Murray Scot Tanner, *Chinese Economic Coercion Against Taiwan – A Tricky Weapon to Use* (Santa Monica, CA: Rand Corporation, 2007), xiii.

[168] Joshua P. Meltzer, "Taiwan's Economic Opportunities and Challenges and the Importance of the Importance of the Trans-Pacific Partnership," 24 February 2014. Brookings East Asia Policy Paper Series. Accessed 1 March 2017, https://www.brookings.edu/research/taiwans-economic-opportunities-and-challenges-and-the-importance-of-the-trans-pacific-partnership/.
This was up from zero before the 1980s and about 17 percent in 2003. See Tanner *Chinese Economic Coercion Against Taiwan – A Tricky Weapon to Use*, xiii.

[169] Kang Zhiqiang, "Pressure from every corner: Taiwan's Petrochemical Industry," *Technology and Industry Across the Straits* Vol. 10 (2015): 83. [康智强， 台湾石油化学制品业：压力四起，海峡科技与产业]. For a perspective of this issue from a CPC employee, see Hsiao Mujun, "Briefly on the quandary and dilemma faced by Taiwan's Petroleum Industry," *Energy Monthly*, January 2001. [蕭慕俊, 淺談台灣石油業的窘境與難題, 能源導報]. Accessed 3 January 2017, http://energymonthly.tier.org.tw/outdatecontent.asp?ReportIssue=200112&Page=30.

[170] Sophia Yan, "Trade has turned China and Taiwan into 'frenemies'," CNN website, 5 November 2015. Accessed 1 February 2017, http://money.cnn.com/2015/11/05/news/china-taiwan-trade-economy/.

[171] See "Taiwan: Rules on Investment by China in Domestic Companies Eased," Global Legal Monitor website, 17 March 2011. Accessed 1 February 2017, http://www.loc.gov/law/foreign-news/article/taiwan-rules-on-investment-by-china-in-domestic-companies-eased/.

[172] Taiwan's outbound investments in China were also prohibited until 1992, and there were still restrictions on them. See "2013 Investment Climate Statement," U.S. Department of State website, February 2013 (details in footnote 71). The cumulative approved Chinese investments in Taiwan up to 2014 were a little more than US$1.1 billion. See "Mainland Investments in Taiwan Reduced by 4.25 percent last year," *China Times* website, 20 January 2015 [陸資來台投資金額 去年減少 4.25%, 中國時報]. Accessed 2 February 2017, http://www.chinatimes.com/realtimenews/20150120003953-260409.
Official figures of Taiwanese investments in China are usually underestimated, especially when such investments were just permitted in the early 1990s when the restrictions were great. Many Taiwanese entrepreneurs invested through third locations, such as Hong Kong or tax havens in the Caribbean. One estimate puts the cumulative figures up to 2009 as about US$117 billion. See Daniel H. Rosen and Zhi Wang, *The Implications of China-Taiwan Economic Liberalization* (Washington, D.C.: Peterson Institute for International Economics, 2011), 26-30.

"asymmetric interdependence" with the Chinese economy, with Taiwan being the more vulnerable partner.[173]

Admittedly, as Murray Scot Tanner points out, Chinese economic coercion against Taiwan would be a "tricky weapon to use."[174] Such a weapon would also hurt China's economy, although proportionally to a smaller degree. More importantly, it would not be easy for China to translate "economic influence into political leverage," especially on the "sovereignty issues." [175] The Taiwanese public's confidence in U.S. commitment to defend the island would make any such translation even harder. In a democratised Taiwan with a rambunctious media, decision-makers became very sensitive to public opinions, whatever their own judgement on the situation may be. Beijing's frustration with the effectiveness of this "softer" approach, however, would only make cross-Strait relations more volatile.[176]

So how does Taiwan's external context of living with U.S. strategic ambiguity and under the shadow or Damocles' sword of Chinese economic, military and diplomatic might relate to securitising Taiwan's quest for oil supply security? While Taiwan's relatively positive relationship with the United States would make securitising about the instability of the international oil markets difficult, Taiwan's overall precarious geopolitical situation seemed to colour every aspect of its policymaking, including oil supply policies.

First, Taiwan would be compelled to have a sizeable oil stockpile so that it would stand a chance to defend itself in a military contingency before help arrived, even with great confidence that the Americans would come to its rescue in case of a China's military attack. One think-tank report suggested that Taiwan's military jet fuel daily consumption to defend the island would be four times higher than its civilian consumption.[177] Calculating Taiwan's total government and commercial oil stockpile and refining capacities up to 2013, the report estimates that Taiwan was able to meet its "combined military and civilian jet fuel needs in an air war for five months" if Taiwan could protect its oil facilities from being damaged.[178] This was about three times longer than China could sustain its combined jet fuel needs with its oil facilities up to 2013 estimates.[179]

Such a scenario can easily be securitised to lobby for the continued existence of an NOC since it can be argued that the military can requisition and reconfigure NOC

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[173] Tanner, *Chinese Economic Coercion Against Taiwan – A Tricky Weapon to Use*, xiii to xiv. Tanner's monograph Taiwan's economy also has numerous other major vulnerabilities that China may target, such as its stock markets, bonds, and foreign exchange markets, information networks.
[174] *Chinese Economic Coercion Against Taiwan – A Tricky Weapon to Use*, 135.
[175] Ibid., 142.
[176] Ibid.
[177] Rosemary A. Kelanic, "Oil Security and Conventional War – Lessons From a China-Taiwan Air Scenario," *Council on Foreign Relations Energy Report*, October 2013, 12.
[178] Admittedly, whether Taiwan could successfully protect its oil stockpiling and refining facilities from air attacks by China is a big if. Ibid.
[179] Ibid.

facilities to produce jet fuel and other needed oil products more swiftly and directly. The same report also surmises that "the potential strain on both countries' [China and Taiwan] fuel supplies may encourage them to pursue policies that would bolster oil access in a worst-case conflict scenario."[180] Regardless of the extent Taiwanese decision-makers already had "strategic oil reserves with military contingencies in mind" as the report writer asserts, the importance of CPC's overseas hydrocarbon E&P efforts can easily be inflated in view of FPC's much smaller existing upstream business and the diplomatic isolation of Taiwan.[181]

Besides, the waters Taiwan tried to explore offshore hydrocarbon have been disputed by numerous countries in the region. The complexity of the geopolitics involved can easily be securitised as a domain only an NOC is capable of handling. By the time the Taiwanese government set up five offshore petroleum E&P regions in 1970,[182] the United States had already begun its soon-to-be-public diplomatic *coup de grace* against Taiwan. As a result, Taiwan or the ROC lost its seat in the UN in 1971, then the diplomatic recognition by the United States in 1979. In 1971, the United States also gave Japan the administrative power over the Ryukyu/Liuqiu Islands and Senkaku/Diaoyu Islands, thus altering the legal maritime territorial boundaries among nations.[183] Not counting China's claims, four of the five original Taiwanese offshore petroleum E&P regions overlapped with claims by Japan or South Korea.[184]

CPC partnered up with at least six U.S. companies, such as Amoco, Gulf, and Conoco Phillips, to explore hydrocarbon potentials in these locales in the early 1970s.[185] By the late 1970s, all of them requested to withdraw from the contracts by exercising the *force majeure* clause in their contracts.[186] Although the United States officially asserted that it took a neutral position regarding sovereign claims in the region, the changing geopolitical situation initiated by the U.S. actions likely contributed to the premature withdrawal of U.S. oil firms.[187]

In 2011, the Taiwanese government issued a license for CPC to explore hydrocarbons in the first offshore petroleum E&P region, centering on Taiping Island/Itu

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[180] Ibid., 13.
[181] Ibid.
[182] Tseng, "Establishment of our country's offshore oil E&P regions and cooperation with foreign companies to explore oil," 11.
[183] Larry A. Niksch, "Senkaku (Diaoyu) Islands: The U.S. Legal Relationship and Obligations," *Crossroads* Vol. 7 (2013). Accessed 2 February 2017, http://www.eacrh.net/ojs/index.php/crossroads/article/view/39/Vol7_Niksch_html.
[184] Ibid., 14.
[185] Ibid.
[186] Some projects were found to be geologically unpromising. Ibid., 14 – 17.
[187] Tseng asserts that the U.S. State Department exerted pressure on these companies of staying clear of projects involving sovereignty claims. 16-18. Also see Niksch, "Senkaku (Diaoyu) Islands: The U.S. Legal Relationship and Obligations."

Abu,[188] a feature of the much disputed Spratly Group.[189] Since the Taiwanese claims in the East and South China Seas have been similar to those of China, partnering up with the Chinese NOC specialising in offshore hydrocarbon E&P, CNOOC, might eliminate one obstacle to Taiwan's quest for "self-developed" oil supply from its surrounding waters.[190]

China reportedly invited CPC to participate in the bidding for E&P in the East China Sea in 1993, but Taiwan did not respond, supposedly out of security and political concerns.[191] After some more secret and abortive attempts of cooperation, CNOOC and OPIC finally signed an agreement to jointly explore the hydrocarbon potentials in the Tainan Basin in 1996.[192] In fact, apart from minimising possible liabilities, the whole purpose of setting up and using the shell company OPIC instead of the name China Petroleum Corporation in CPC's overseas oil E&P was to sidestep thorny political and diplomatic issues discussed earlier.[193] CNOOC and OPIC engaged in a few more joint projects over the years, as listed in Section 2.4.[194]

This sub-section has maintained that Taiwan's quasi-alliance with the United States in isolation would make securitising about the international oil markets difficult. It was, however, exactly the external context that led to the pursuit of this relationship outside normal diplomatic channels and the ramifications of such a quest that have necessitated the Taiwanese government to juggle volatile and high-stake factors to keep the island diplomatically, politically, and economically viable. I argue that these factors have caused successive Taiwanese governments, even the more pro-independence, pro-liberalisation DPP, to be more risk averse in the pace of NOC privatisation and oil supply policies in general. The Tainan Chaoshan Petroleum Operating Company Limited [台南潮汕石油作業公司], the first 50-50 joint venture between OPIC and CNOOC for the E&P in the Tainan

[188] Tseng, "Establishment of our country's offshore oil E&P regions and cooperation with foreign companies to explore oil," 19.
[189] By 2016, Taiwan seemed to have built some structure on Taiping (which is not legally an "island" under the UN Convention on the Law of the Sea). See Ankit Panda, "South China Sea: What's Taiwan Building on Itu Aba?" *The Diplomat*, 21 September 2016. Accessed 3 February 2017, http://thediplomat.com/2016/09/south-china-sea-whats-taiwan-building-on-itu-aba/.
[190] Although CPC's drilling around Taiping Island/Itu Aba was not a project that partnered up with CNOOC, the Chinese government seems to be rather tolerant of its actions so far. CPC's existing cooperative relationship with CNOOC as well as the propaganda and/or political intention may have contributed to China's unusual reticence. See J.R. Wu, "Beijing untypically quiet on Taiwan drills in South China Sea," Reuters website, 30 November 2016. Accessed 3 February 2017, http://www.reuters.com/article/us-southchinasea-taiwan-idUSKBN13O0SU.
[191] Xi Zhigang, "Front and Back Stages of Cross-Strait Petroleum Cooperation," *Phoenix Weekly* 5 February 2013 [席志刚, 两岸石油合作台前幕后, 凤凰周刊]. Accessed 3 February 2017, http://www.ifengweekly.com/detil.php?id=731.
[192] Ibid.
[193] *Taiwan Petroleum Exploration 2011-2015 - Volume Eight*, 189. (Chapter Four – Exploration and Production of Overseas Exploration Blocks), 189 and 193. For more about the establishment of OPIC in 1979, see footnote 31. China Petroleum Corporation was only renamed CPC Corporation in 2007. See footnote 5.
[194] Xi Zhigang, "Front and Back Stages of Cross-Strait Petroleum Cooperation."

Basin and the Chaoshan Trough, for example, was established in 2003, during the DPP presidency.[195] Taiwan's overall external context, therefore, is not conducive to a high level of trust in solely relying on the open markets for its oil supply. While Taiwan's relatively positive relationship with the United States did offer it some reassurance, the Taiwanese government is risk neutral at best. This would lead to a medium level of trust in relying on the international oil markets alone and hence the great emphasis on "self-developed" oil.

The more in-depth investigation in this section shows that Taiwan scored a medium in each of the components making up the overall trust in the oil markets. Its traditional and vertically-integrated NOC did not securitise its role too strongly, probably because it was also the administrator in a sector decision-makers had set a clear goal of liberalisation. Taiwan's domestic context of a high level of economic development was not as salient as demands generated by its populist politics. Its external context of having a quasi-alliance with the United States was overshadowed by its precarious geopolitical situation represented by its relationship with China. Taiwan's overall trust level in the markets' capability of ensuring reliable and affordable oil supply, therefore, should more accurately be described as "medium." All these factors at best made the state risk neutral about the long-term savings but probably short-term volatility that may accompany total reliance on open markets.

6. Taiwan's Implementation Capability

Taiwan only had a medium, not high, overall capability to implement strategic oil supply measures according to the preliminary study, which is another condition incongruent with the pathway to the adoption of a high level of such measures formulated by H3. This section examines in greater details the components making up the overall capability of Taiwan in the period studied to re-assess the accuracy of the preliminary result. The section also investigates if there is any empirical link between these capabilities and the level of strategic oil supply measures adopted.

Taiwan's overall medium implementation capability is made up of a high financial capability score, a low diplomatic capability score and a medium centralization score. After more in-depth investigation of these three components, this overall capability appears to straddle between a medium and high level by global standards. The key is the relative importance of financial capability and diplomatic capability in the actual implementation of strategic oil supply measures.[196] Taiwan has a high financial capability but a medium diplomatic capability by global standards. Further, its diplomatic capability was derived

[195] Ibid. Also see *Taiwan Petroleum Exploration 2011-2015 - Volume Eight*, 189. (Chapter Four – Exploration and Production of Overseas Exploration Blocks), 194.
[196] The preliminary study essentially gives these three components equal weights.

mostly from its financial capability and had a tenuous diplomatic basis, due to its awkward diplomatic position in the international arena.

6.1 Taiwanese Financial Capability

The high financial capability of Taiwan in 2013 was made up of its high level of foreign reserves and credit worthiness, and medium GDP. It had the third highest foreign exchange reserves among the nine case-study economies, after China and Japan.[197] Even on a global scale, its US$423.9 billion reserves still makes Taiwan among the top five reserve-holding economies.[198] Its 2013 credit worthiness shared the same highest score on with China and Japan among the case-study economies.[199] In a quick counting with the S&P rating only for about 130 economies globally, Taiwan was still among the top 30, so it justifiably retains its high trichotomous level.[200] As to its GDP, Taiwan ranked the fifth among the case-study economies.[201] By one account, it ranked 22 out of 230 economies in the world around 2016 on a U.S. dollar purchasing power parity basis.[202] Even compared by per capita GDP, Taiwan still ranked 30th among the same economies.[203] Its GDP, therefore, would move up to be among those having a high trichotomous level by global standards. Overall, Taiwan indeed had a high financial capability to implement strategic oil supply measures if it so inclined, even by global standards.

In the comparative studies in Chapter Four, NOC profitability is investigated as an additional source of capability. Taiwan's relatively recent and uneven implementation of oil price liberalisation is reflected in the widely fluctuating profit or loss of CPC in the years preceding 2013. Huge losses were incurred in the years CPC was instructed to "stabilise" domestic gas and diesel prices while the international prices were rising. The result was that it had a modest five-year (2013-2009) average loss and a large six-year average (2013-2008) loss and corresponding negative profit-to-equity ratios. As a comparison, the five-year ratio of both India and Thailand's NOCs of the same period are over 10 percent. Table 5.5 below illustrates the situation:

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[197] See Table 3.11 in Chapter Three.
[198] According to the World Bank data, Saudi Arabia's over US$700 billion and Switzerland's over US$500 billion reserved in 2013 would have pushed Taiwan down two ranks (The World Bank does not present information on Taiwan directly).
[199] It was 4.3 by averaging the IMF 24-point scale results from three credit reporting agencies. See Table 3.13 in Chapter Three.
[200] "Credit ratings: how Fitch, Moody's and S&P rate each country," The Guardian website, last updated 3 January 2013, accessed 12 February 2016, http://www.theguardian.com/news/datablog/2010/apr/30/credit-ratings-country-fitch-moodys-standard.
[201] After China, Japan, India, and South Korea's. See Table 3.12 in Chapter Three.
[202] "Country Comparison: GDP (Purchasing Power Parity)," CIA website. Accessed 3 February 2017, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2001rank.html#tw.
[203] "Country Comparison: GDP Per Capita (PPP)," CIA website. Accessed 3 February 2017, https://www.cia.gov/library/publications/the-world-factbook/rankorder/2004rank.html#tw

Year	net profit/loss (1,000 NT$)[204]	net profit/loss (1,000 US$)[205]	Owner's equity (1,000 NT$)	profit/equity ratio (%)	Oil Pricing Adjustments
2013	3,292,244	$113,500	227,102,848	1.45	MoEA initiates think-tank review of pricing formulae
2012	-33,728,183	-$1,122,860	222,073,545	-15.19	Floating pricing resumed in April
2011	-32,449,832	-$1,112,630	273,593,428	-11.86	Halving of international price hike continued
2010	16,074,346	$503,109	267,989,508	6.00	Halving of int'l price hike began in December
2009	37,652,597	$1,147,260	253,225,695	14.87	Largely floating
2008	-120,058,736	-$3,658,150	213,867,151	-56.14	Capping price hike at 12% between Dec 07 to May 08
five-year average (2013-2009)		**-$94,324**	**five-year average (2013-2009)**	**-0.95**	
six-year average (2013-2008)		**-$688,295**	**six-year average (2013-2008)**	**-10.14**	

Table 5.5 CPC Profitability 2013 – 2008

The situation summarised in the table above suggests that CPC did not have much financial capability to pursue oil E&P projects or other strategic oil supply measures independent of that endowed by the Taiwanese government. As discussed in Section 2.1 above, the Petroleum Administration Act did provide partial E&P subsidies to domestic oil firms, but the Bureau of Energy was still responsible for approving the applications. The maximum subsidy was only 50 percent for exploration projects and 12 percent for development projects. In short, the Taiwanese government had high financial capability to implement strategic oil supply measures, such as the various types of oil supply related subsidies stipulated in the Petroleum Administration Act, including the more market-conforming subsidies provided to operators in remote areas. However, the financial situation of CPC did not add much to this capability. The oil pricing adjustments shown in Table 5.5 suggest that financial capability in the form of profit or loss by CPC did contribute to the

[204] Net profit/loss and owner's equity figures are extracted from CPC English language annual reports of various years. It is interesting to note that these figures are not available in the Chinese language annual reports.

[205] Calculation is made using figures from the left hand column and historical exchange rates of respective years. Historical exchange rates are obtained from "Oanda Currency Converter," accessed 3 February 2017, https://www.oanda.com/currency/converter/.

level of strategic oil supply measures adopted in the form of how much or how long pricing adjustments could be sustained in addition to political considerations as discussed in Section 5.2 above.

6.2 Taiwanese Diplomatic Capability

Taiwan received the lowest score for diplomatic capability in the plausibility probe of this study because it was not even a UN member. Various types of UN memberships are the only criterion used there to gauge this capability as they have different potentials to generate quid pro quo that may be sought by oil supplying nations. In the comparative studies, the expenditures of government ministries and departments that likely have oil diplomacy functions are examined to expand the evaluation of respective countries' implementation capability. Similar procedures are followed in the case of Taiwan.

Taiwan's Ministry of Foreign Affairs (MoFA) deals with political entities, international organizations and activities Taiwan received formal recognition as well as those it does not. Still, MoFA publications hardly mention its goals, activities or expenditures related to oil or even energy, let alone oil diplomacy.[206] A few mentioned the development of "green" or renewable energy, such as helping the Solomon Islands develop solar power,[207] or promoting green energy products during the APEC meetings in Taiwan.[208] The fact that only a couple of the twenty odd countries Taiwan had diplomatic relationships with throughout the period studied were oil producing partially explains the rare appearances of oil diplomacy related terms.[209] It was also likely that oil diplomacy related activities have been the domain of OPIC and its many affiliates, and for a long time, also

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[206] The publications examined are The Foreign Relations Yearbook of ROC [中華民國外交年鑑] and the MoFA Units Annual Final Accounting Reports [年度外交部單位決算] between 2009 and 2013. Both can be accessed via the ROC MoFA website. The former accessed 10 February 2017,

http://www.mofa.gov.tw/NewsNoHeadOnlyTitle.aspx?n=19C2F1F943CBD946&sms=3769C374A22343F0.
The latter accessed 9 February 2017,

http://www.mofa.gov.tw/NewsNoHeadOnlyTitle.aspx?n=5AEE5471C1A1C223&sms=7286F69C9C4DFC22.

[207] In Chapter Two "External Relations," *2010 Foreign Relations Yearbook of ROC*. Accessed 10 February 2017, http://multilingual.mofa.gov.tw/web/web_UTF-8/almanac/almanac2009/html/08-1-1.htm.

[208] *MoFA Units 2012 Annual Final Accounting Reports*, 12.

[209] In 2000, Taiwan had diplomatic relationships with 29 countries. Among these countries, oil had already been or would soon be discovered in Chad, Costa Rica, and Gambia. Costa Rica would be the only one among the three that were already producing oil before breaking diplomatic relations with Taiwan in 2007. The other two countries were likely only at the exploration stage when they maintained diplomatic relations with Taiwan. For the list of the countries mostly have severed relationships with ROC since 2000, see Czeslaw Tubilewicz and Alain Guilloux, "Does size matter? Foreign aid in Taiwan's diplomatic strategy, 2000-8," *Australian Journal of International Affairs* 65:3 (2011):323.

KMT-owned or sponsored enterprises.[210] Taiwan's diplomatic dilemma nurtured the "corporate emissary" function of KMT affiliated companies and even after the separation of the state from the party in the late 1980s.[211] The KMT most likely still "has not given up its habit of utilising its own stable firms to carry out strategic goals."[212]

This caveat notwithstanding, this study does conduct an analysis of Taiwanese MoFA's expenditures between 2009 and 2013. The ministry's five year (2013-2009) total expenditure to GDP ratio is 0.16, which is more than double the same ratio of counterpart ministries and other relevant departments for the same period in all the other three economies examined so far.[213] This ratio drops to 0.09 if the items related to foreign aid, "international care and rescue" [國際關懷與救助] and "international cooperation" [國際合作], are taken out.[214] That it is still higher than India, Thailand, or China's official relevant departments to GDP ratio.

If we add this factor to the likelihood that many oil diplomacy functions would be carried out by other entities (as stated earlier), Taiwan's oil diplomacy capability does not seem so low. Due to Taiwan's structurally awkward international position, which makes it difficult to offer any substantive diplomatic support freely to oil producing nations or international oil or energy organizations, however, its oil diplomacy capability could not elevate to a trichotomously high level any time soon. A middle level would be more befitting during the period studied.

Taiwan received the medium centralization score as a democracy in the preliminary study since democratic states are hypothesised to be generally less efficient in implementing policies they want in the short and medium term than autocracies, but are more stable and efficient than anocracies. The 2008 elections were the second largely peaceful change of power through free and fair elections in Taiwan.[215] The existence of a "no-holds-barred" Taiwanese media in this century is another signpost that this polity had

[210]Ten overseas OPIC affiliates in various countries are listed on one CPC website. See footnote 31.
[211] Fields, "KMT, Inc. Party Capitalism in a Development State," 6.
[212] Ibid. KMT controlled both the Executive and Legislative Branches between 2008 to 2016.
[213] India's ratio was 0.07, Thailand's 0.06, and China's was 0.011. See Chapter Four. Taiwan's ratio does not change even if its expenditures for the item "international care and rescue" [國際關懷與救助] is deducted. Sources of these expenditures are from the MoFA Units Annual Final Accounting Reports. See footnote 204 for details.
[214] Supposedly, the MoFA used the sizeable "international cooperation" budget as a "confidential budget" for foreign aid in addition to the official aid budget from the Overseas Economic Cooperation and Development Fund. See Tubilewicz and Czeslaw, "Does size matter? Foreign aid in Taiwan's diplomatic strategy, 2000-8," 326-329.
[215] The first time was from KMT to DPP in the 2000-2001 presidential and legislature elections and the second time from DPP to KMT in the 2008 elections.

transitioned from an anocracy to a democracy in the period studied.[216] The sensitivities Taiwanese decision-makers exhibited towards possible negative consequences of oil price hikes during election seasons despite their near consensus of the long-term direction of sector liberalisation illustrates the brake democracy may put on liberalisation. In fact, it reveals an inverse trend: the executive branch can only implement strategic oil supply measures either with the agreement of or be ready to fight with opposition politicians, especially if they control the legislature. Taiwan's middle centralisation score, therefore, seems appropriate in its impact on the overall capability to implement strategic oil supply measures.

7. Conclusion

The data presented in this chapter show that the pathway that led Taiwan to adopt a high level of strategic oil supply measures around 2013 does not diverge as much from that of H3 as implied in the preliminary study. Yet, the two causal paths still do not completely overlap with the way variables are currently operationalised.

Taiwan's OV did not reach a high level among major net oil importing economies in the Asia Pacific region. It, however, almost certainly reached a trichotomously high level by global standards due to the exceptionally high OV of the region compared to other regions of the world. The overall strength of Taiwan's private capital remained high, including in the petroleum sector, but international capital was still relatively weak in the island's economy. Taiwanese decision-makers' trust in the oil markets was best described as medium due to their neutral risk tolerance created by securitising contexts most pertinent to these individuals. The Taiwanese government probably still only had an overall medium capability to implement strategic oil supply measures due to its delicate diplomatic position in the international arena. Nonetheless, it had a high financial capability to implement these measures even by global standards and its high financial capability clearly enabled the government to implement a high level of such measures. Table 5.6 below summarises these results and the divergences with the stipulations of H3 and results in the preliminary study.

	DV Level	**OV (IV) Level**	**Strength of Private Capital**	**Overall Trust in Oil Markets**	**Overall Implementation Capability**
Perfect Fit (Three-High Cases)	**High**	**High**	**High**	**Medium**	**High**
Taiwan 2013 In-depth results	High	Medium/High	High	Medium	Medium/High
Taiwan 2013 preliminary results	High	Medium	High	High	Medium

Table 5.6 Taiwan's 2013 Variable Levels compared to H3 Stipulations

[216] Taiwan earned a "democracy" score by the mid-1990s (between six and nine) and a full or consolidated democracy score (10) by the mid-2000s. See "Polity IV Country Report2010: Taiwan." Accessed 2 February 2016, http://www.systemicpeace.org/polity/Taiwan2010.pdf.

The pathways the vulnerability-interaction model hypothesises to lead to the adoption of a high level of strategic oil supply measures are based on two *a priori* conditions: having a high implementation capability and NOT a high level of trust in the markets. Taiwan's case seems to suggest that the two *a priori* conditions are not equal in importance. Not having a high level of trust in the markets seems to be more important than having an overall high implementation capability in causing the adoption of a high level of strategic oil supply measures, especially in economies that are generally open and free. This study of Taiwan also suggests that financial capability is a more important component to the overall implementation capability than diplomatic capability.[217] Taiwan clearly qualifies to have a high financial capability both by regional as well as global standards, but at best a medium diplomatic capability. Most of the strategic oil supply measures the Taiwanese government continued to adopt were sustained by its high financially capability.

If Taiwan's OV is viewed by global, not regional, standards and that its overall implementation capability may be considered high with financial capability given greater weight, then Taiwan's conditions as of 2013 would fit the stipulations of H3. These two "ifs" do not stray far from the facts. Instead, the former expands the scope of the study beyond the Asia Pacific to possibly make it more generalisable. The latter appears to be a reasonable refinement to the measurement of the variable. The stipulations of H3, therefore, are not amended at this point and its validity is conditionally confirmed pending further testing with more cases in future research, especially with financial capability being given a greater weight.

The apparent hierarchy among the two *a priori* conditions to the adoption of a high level of strategic oil supply measures relates to the trivialness or relevance of necessary and sufficient conditions in their causal roles in any particular event. In an extreme example, the presence of oxygen is also a necessary condition for decision-makers of a net oil importing economy to adopt strategic oil supply measures. This is obviously an infinitely less relevant necessary condition.[218] The second level of the vulnerability-interaction model as it is currently formulated implies two of the four explanatory variables hypothesised by the model, the two *a priori* conditions, have greater importance in causing the adoption of a high level of strategic oil supply measures than the remaining two. It does not, however, differentiate the significance among the two *a prior* conditions. This in-depth study of Taiwan suggests that NOT having a high level of trust in the oil markets is a more relevant

[217] In the plausibility probe, the two were basically given the same weight.
[218] In the language of set-theoretic ideas that underlie the proposed model, adopting a high level of strategic oil supply measures (Y) is a minute subset of the necessary condition of the presence of oxygen (X1) and a larger subset in the necessary condition of having a high level of trust (X_2).

necessary cause to the adoption of high level of strategic oil supply measures than having a high overall implementation capability.

The high level of strategic oil measures adopted by Taiwan in the decade leading to 2013 resulted more from the state not having a high capacity, as expounded by Ikenberry, to wield market instrument decisively than from the state actively trying to control oil supply to the economy.[219] The Taiwanese government clearly recognised the value of economic liberalisation and tried to privatise its NOC and let oil product prices float by this century, but it ran into stiff resistance from the trade union. Taiwanese decision-makers were also very sensitive to the pressure of populist demand for artificially low oil prices. Taiwan's precarious geopolitical situation facilitated securitising the island's oil supply, enabled the government at times to be "captured" by an oligopolistic private oil firm, and generally made decision-makers more risk averse. All these situations combined to lowed decision-makers' overall trust in relying solely on the market to supply oil to the economy.

[219] Ikenberry, "The Irony of State Strength: Comparative Responses to the Oil Shocks in the 1970s." *International Organization* 40-1 (1986): 132.

Chapter Six
Oil Sector Liberalisation, Fast and Slow[1]

This thesis has evaluated the puzzling phenomenon that many governments of net oil importing economies continued to intervene in their economies' oil supply well after oil began trading in open international markets. This was the case even though many domestic oil markets have been liberalised to varying degrees during the same period. State-sponsored oil supply activities re-emerged as an important issue in international political economics in the first decade or so of this century due to rising oil prices. The focus of related commentary and research has been the overseas hydrocarbon exploration and production (E&P) activities of Chinese national oil companies (NOCs). Upon closer examination, however, many other Asian net oil importing economies also adopted different levels and types of what this study labels strategic oil supply measures.

Neither neoliberal economists nor Realist/geopolitical theorists seem to have satisfactorily answered the two key research questions generated from this puzzle. These are (1) What explains variations in the levels of strategic oil supply measures adopted by Asian net oil importing economies between 1994 and 2013; and (2) what explains the adoption of a high level of such measures by at least some of those economies during this period?

The goal of this study has been to delineate and assess the circumstances that resulted in continuing but differing levels of state intervention in the oil sectors of Asian net oil importing economies. The puzzle of the study embodies at least two implicit assumptions. First, the open market is generally a more efficient way of obtaining oil supplies. Second, states aim to adopt the most efficient measures to obtain oil supplies to underwrite their economies. As discussed further below, a more nuanced understanding of these assumptions has emerged during the investigations undertaken in the previous chapters to unlock the apparently puzzling phenomenon that motivated this thesis.

Without assigning prescriptions of what states should or should not do to their oil sector governance, what would be the contribution of studying the causes for oil dependent states to intervene in the oil marketplace to international relations? First, it may highlight misconceptions of what underwrites the motives of state actions in the oil sector. Such misunderstandings would otherwise have a damaging effect on international and regional relationships given the relative prominence of the zero-sum (neorealist) narrative of resource acquisition policy calculations.

[1] The title of this chapter is homage to the book by the Nobel laureate Daniel Kahneman, *Thinking, Fast and Slow* (New York: Farrar, Straus & Giroux, 2011).

Second, despite the many worthy studies on more sustainable and renewable energy sources that have been developed in recent years, oil is - and likely will remain - an important energy source of the world in the coming decades.[2] In the Asia Pacific, oil consumption as a percentage of primary energy was a little lower than the global average in the decade preceding 2013.[3] As the only region where coal accounts for a larger share of primary energy source than oil,[4] however, it may be relatively better for the global environment if Asia increases the use of natural gas and oil, in lieu of coal. Although China has aggressive plans to increase its nuclear capacity to lower its overwhelming reliance on coal, the low base it started from means that there should be simultaneous room for increase in oil and gas and renewable energy usage.[5] Besides, nuclear energy is not a ready substitute of oil or even natural gas in the transportation sector in the foreseeable future, judging by the current state of technological developments.[6] The determinants of the level and mode of state intervention in oil supply, therefore, would still be a consequential issue, especially in the Asia-Pacific.

This study employs a deductive "vulnerability-interaction model" to address the two research questions about the causes to variations in the levels of strategic oil supply measures adopted by Asian net oil importing economies. This model provides a clear and potentially generalisable framework for analysing the causes of continued state intervention in the Asian Pacific oil sector which has so far been lacking in the relevant existing literature. The model proposes that a polity having a noticeable level of oil vulnerability (OV) is a

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[2] In 2015, it accounted for about 33% of the world's primary energy consumption according to data on *BP Statistical Review of World Energy June 2016*, 41. Accessed 2 February 2017, https://www.bp.com/content/dam/bp/pdf/energy-economics/statistical-review-2016/bp-statistical-review-of-world-energy-2016-full-report.pdf.

[3] In 2004, oil accounted for about 34% of the Asia-Pacific's and 37% of the world's primary energy consumption, while that figure for the Asia Pacific in 2015 was about 27%. For the 2015 data, see above. For the 2004 data, see *BP Statistical Review of World Energy June 2006*, 41.

[4] Same data source as in footnote 3.

[5] In 2010, nuclear energy accounted for 0.69 percent of China's primary energy consumption and that figure increased to 1.28 percent in 2015, while coal accounted for almost 64 percent of the country's primary energy consumption in 2015 and about 70 percent its power generation around 2016. Sources of data for the calculation are from *BP Statistical Review of World Energy June 2016*, 41 and *BP Statistical Review of World Energy June 2011*, 41. China reportedly tries to triple its nuclear capacity by 2026. See Stephen Stapczynski, "China's Nuclear Power Capacity to Overtake U.S. Within Decade," Bloomberg News, 31 January 2017. Accessed 20 February 2017, https://www.bloomberg.com/news/articles/2017-01-31/china-s-nuclear-power-fleet-seen-overtaking-u-s-within-decade.

[6] There have been research on using "synergistic energy carriers" such as hydrogen, electricity, or liquid fuels to incorporate nuclear energy to power vehicles, but actual nuclear-powered cars for the retail market do not seem to be a viable option in the foreseeable future. See Masao Hori, "Nuclear energy for transportation: Paths through electricity, hydrogen and liquid fuels," *Progress in Nuclear Energy* 50 (2008): 411-416. Also see Sebastian Anthony, "Where are all the clean, infinite-range nuclear-powered cars, ships, and plans?" Extreme Tech website, 25 July, 2014. Accessed 30 March 2017, https://www.extremetech.com/extreme/186907-where-are-all-the-clean-infinite-range-nuclear-powered-cars-ships-and-planes.

sufficient but not necessary cause for its decision-makers to *desire* to adopt strategic oil supply measures. The actual level of these measures adopted at any given time - the dependent variable (DV) - is the result of interaction among the economy's OV and three other factors within a given polity: (1) the level of decision-makers' trust that oil markets can supply reliable and affordable oil to the economy, (2) the economy's overall implementation capability of strategic supply measures; and (3) the overall strength of private capital versus that of state capital in the economy.

The vulnerability-interaction model specifies the result of the interaction of these explanatory variables in four cases. The two hypothetical "extreme cases" according to the reasoning of the model are: (1) a net oil importing economy with a low OV, high trust, low capability, and high strength of private capital would adopt a low level of interventionist or strategic oil supply measures or none at all; or (2) one with a high OV, low trust, high capability, and low strength of private capital would adopt a high level of such measures. Each of these extreme cases or the groupings of explanatory variables as a whole forms an unnecessary but sufficient pathway to the adoption of respectively a low and a high level of strategic oil supply measures.

Short of these extreme cases, the model hypothesises two pathways or INUS causes for the adoption of a high level of strategic oil supply measures.[7] These are: (1) net oil importing economies with high OV, medium trust in oil markets, high capability, and high-strength private capital versus that of the state (H3 or Three-High cases); and (2) ones with a noticeable level of OV, high capability, NOT having high trust in oil markets, nor high-strength private capital (H4 or Non-Three-High cases).

In response to the first research question of what causes the variations in strategic oil supply measures adopted, the vulnerability-interaction model predicts the comparative levels of strategic oil supply measures adopted by two net oil importing economies at the same period or by the same economy in two distinct periods under two situations. They are encapsulated in the following two hypotheses. H1 states that if the levels of all four explanatory factors are similar, the value of the DV should be similar. H2 contends that if the levels of three factors are similar in two cases, their DV levels should be congruent with the result caused by the difference in their fourth factor as predicted by the proposed model. If the only difference among the explanatory variables between two economies is that one has a higher trust in oil markets, for example, H2 predicts that the one with a higher trust would adopt a lower level of strategic oil supply measures.

[7] INUS is the acronym of "an *i*nsufficient but *n*ecessary part of a condition which is itself *u*nnecessary but *s*ufficient for the result." James Mahoney, "Toward a Unified Theory of Causality," *Comparative Political Studies* 42:4/5 (2008), 418.

Due to the previously untested nature of the model, this thesis conducts a plausibility probe in Chapter Three with relatively uniform and simpler data of nine Asian net oil importing economies to gauge if the model's premise is credible. The results show the vulnerability-interaction model offers a plausible explanation for variation in the level of the state intervention in oil supply of net importing economies. Out of the 36 pairs of cross-case comparisons generated from the nine economies' 2013 data, one pair, India and Thailand, matches the parameters of H1, meaning the levels of all their four explanatory variables were the same. Both also adopted the same trichotomous level of strategic oil supply measures in 2013, congruent with the expectation of H1. Five pairs of these comparisons emerge with parameters of H2, meaning the levels of three out of their four explanatory variables were the same in 2013. Three out of these five pairs, or 60 percent of the pertinent cases, have DV levels that conform to the expectation of H2. The only substantive difference between the four explanatory variable levels between China and India was China's markedly higher implementation capability and China had a higher DV as predicted by H2. The same is true for China and Thailand. The only substantive difference in the four explanatory variable levels between Japan and Singapore again was Japan's higher implementation capability. Japan also had a higher DV as predicted by H2.

Chapter Three also examines the cross-temporal validity of the vulnerability-interaction model by comparing the 2013 data of the nine economies with commensurate 2003 data. These two data points represent roughly the end of one decade of high and low oil prices in the international markets respectively. Four of these nine within-case studies emerged with no change in the levels of any of their four explanatory variables over the decade. Among the four, two are congruent with the predictions of H1, meaning no change was evident in the level of the strategic oil supply measures they adopted, as expected. Two of the cases match the parameters of H2. Judged by a adherence to the letters of the hypothesis only, neither's DV level changed in the direction predicted by the change of the one explanatory variable having a trichotomously different level over the decade. As detailed in Chapter Three, however, both conform to the reasoning of the proposed model.

The findings of the levels of the variables of the nine economies in the preliminary study are used to gauge the initial plausibility of the two pathways hypothesised to explain the adoption of a high level of strategic oil supply measures, H3 and H4. Taiwan's situation was the most appropriate for further investigation of the pathway resulting in the adoption of a high level of strategic oil supply measures by a generally open and free economy. On the other hand, China's 2013 data match all the stipulations of H4.

Chapter Four presents more detailed data to investigate the cross-case validity of H1 and H2. India and Thailand are selected as the country pair for examining H1 because all their explanatory variables are identified as having the same levels in the plausibility

probe. After more detailed and country-specific data are taken into account, the trichotomous levels of all their variables remain the same. The cross-case validity of H1, therefore, passes the test of the most different research design considering the great differences between the two countries. These include many respects other than the explanatory variables, such as population, geographical size, political and economic systems. Future research may investigate if the specific configuration of these two countries' four explanatory variables in 2013 is a reliable causal pathway to the adoption of a medium level of strategic oil measures: medium implementation capability and low level of the remaining three explanatory variables.

Among the three pairs of cases preliminarily congruent with the predictions of H2, China and India are chosen to further investigate the hypothesis' validity. Their respective explanatory and dependent variable levels in the plausibility probe withstand the scrutiny of more detailed data in the second half of Chapter Four. China's markedly higher implementation capability continues to be the determining factor that explains the higher level of strategic oil supply measures it adopted in the years leading to 2013. While the values of the other three explanatory variables change slightly after more data are analysed, they do not warrant changes in trichotomous levels. The cross-case validity of H2, therefore, is also confirmed. Since China's configuration match that of H4, this comparative study also serves as a confirmation of the causal pathway to the adoption of a high level of state intervention in the oil sector suggested by H4 – those of the non-three-high cases.

Chapter Five investigates Taiwan's pathway to the adoption of a high level of strategic oil supply measure in an effort to further investigate and refine H3. Under closer examination, Taiwan's conditions in the decade preceding 2013 still did not conform totally, but moved closer to, the stipulations of H3. Most importantly, the polity's overall trust in the oil markets was lowered to a trichotomously medium, not high, level as in the preliminary study. The vulnerability-interaction model conceptualises the level of trust in oil markets as the central explanatory variable that "binds" all the others together. Not having a high level of trust, therefore, is hypothesised as one of the two *a priori* conditions that leads net oil importing economies to adopt a high level of strategic oil supply measures.

Having a high implementation capability was originally deduced to be the other *a priori* condition. Taiwan's capability as of 2013 still did not reach an overall high level, despite its high financial capability even by global standards. This was mainly due to its ambiguous sovereign status in the international arena and its diplomatic isolation. Future research may test the idea that having at least a medium overall capability is a more appropriate *a priori* condition. Alternatively, diplomatic capability probably contributes less to the overall implementation capability than is currently formulated. The findings on Taiwan as well as those on other case studies gleaned from both the plausibility probe and

the in-depth paired comparisons suggest that implementation capability is of secondary importance compared to trust in oil markets and possibly path dependency. In the parlance of the set-theoretic method of social sciences that underpins this thesis, implementation capability is a less relevant necessary pre-condition for the adoption of a high level of strategic oil supply measures than is trust.[8]

Of the four economies in the plausibility probe that receive a low trust level score in oil markets in this study - China, India, Indonesia, and Thailand - none of them had a low DV level in 2013. On the other hand, of the two polities that had high capabilities, only China - (also having a low trust level) - implemented a high level of strategic oil supply measures in 2013. Japan, the other high-capability economy, had a higher trust in oil markets. Even with a high OV, it only had a medium, not high, level of DV.

The case of Taiwan shows that once a national oil company (NOC) was established, it becomes very "sticky," meaning the divestment process tends to be long and arduous. Of the nine cases studied in this thesis, only Singapore's NOC was totally divested. All the other eight began some sort of divestment or corporatisation process about two decades earlier, but none of the NOCs has become minority government-owned yet. NOCs tend to justify their existence by exaggerating their importance in ensuring reliable and affordable oil supply to decision-makers and the public of their host economies. They also sometimes unduly link oil supply with national and international security concerns. All these tend to lower decision-makers' trust in the oil markets. NOCs are also competitors of private capital in the oil sectors. These two situations form a feedback loop that reinforces both factors.

Overall Implications of Thesis

In the meantime, a broader understanding of the apparent tension between the drive for greater oil sector liberalisation and the continued intervention in the sector emerges from the analysis presented in this study. First, oil governance globally has generally been moving towards being more transparent and supply-and-demand-driven with the establishment of the open international oil markets in the last three decades than in previous eras. This was not only true in advanced industrial economies,[9] but also in the Asia-Pacific, including China and India. The cross-temporal study in this thesis shows that seven out of the nine case studies adopted either the same or a lower level of strategic oil supply measures over a

[8] For a discussion of the relevance or trivialness of necessary and sufficient conditions, see Carsten Q. Schneider and Claudius Wagemann, *Set-Theoretic Methods for Social Sciences* (Cambridge: Cambridge University Press, 2012), Chapter 9, Kindle Edition.
[9] See Hughes, *Globalizing Oil*.

decade of rising oil prices.[10] The marketisation and later financialisation of the international oil markets was facilitated by the increasing number of non-OPEC oil exporting countries and advancements in oil E&P and information technologies. This process is analogous to a long-term "evolution" towards the equilibrium of a more efficient mode of exchange at the global or "population of states" level.[11]

Decision-makers in individual net oil importing states, while also striving for efficient oil supply to their economies are nevertheless akin to managers confronted with the subjective costs associated with the unique conditions of their respective economies (firms) at a particular point in time. To them, "[e]conomic costs are inherently subjective, because different decision makers sacrifice different alternatives at the moment of choice based on different perceptions of and preferences for the alternative opportunities in a world of uncertainty."[12] Figuratively, decision-makers' political imperative to live to fight another day or serve another term is mostly predicated on issues that have shorter time horizons. Energy or oil supply security and efficiency is only one of the many issues on their policy plates, and under most circumstances, the issue of reliable oil supplies is not raised to the highest level of urgency or importance. Sometimes, strategic oil supply measures are adopted because of reasons not related to oil supply security or efficiency, such as to serve more urgent political or diplomatic objectives. Again, as with individual firms, "in the short run, disequilibrium prevails, and both efficient and inefficient forms [of governance] will be observed to coexist."[13]

Taiwan and China, for example, both adopted a high level of strategic oil supply measures up to 2013 by global standards. Decision-makers in both economies, however, appeared to agree that a liberalised oil sector is more efficient to fuel their respective economies. Still, they did not or could not liberalise their oil sectors at a faster pace. This was due to many competing objective demands and restraints in their own polity, as well as decision-makers' perceptions of the polities' domestic and external environments, which in turn determined their risk preferences.

The vulnerability-interaction model suggests that the narrative of the aggressive zero-sum form of economic nationalism is the major "tool" securitising agents such as NOCs use to lower decision-makers' risk preference regarding their polities' external environment. This is especially true in conducting their relations with the existing

[10] The Philippines and South Korea are the only two exceptions. As detailed in Chapter Three, the Philippines' level of DV went up but its oil sector was actually more market-oriented over the decade.
[11] The insight for the analysis in the non-synchronous speed of oil sector liberalisation at the population (of states) and individual states levels originates from the discussions of the two different levels of transaction cost economics by Chiles and McMackin in "Integrating Variable Risk Preferences, Trust, and Transaction Cost Economics."
[12] Chiles and McMackin, 77.
[13] Ibid., 76,

hegemonic power of the United States. China was the one case-study polity that had a neutral-conflictual relationship with the United States in 2013, which has since deteriorated further. In the meantime, the zero-sum form of economic nationalism has been crescendoing in some parts of the world, not the least in the United States. This does not seem to bode well for expedited oil sector liberalisation in China, even with the lowering of oil prices in the international markets since 2014.

The cross-temporal study in this thesis also suggests that oil price changes by themselves seem to have a less prominent effect on the level of strategic oil supply measures adopted than both changes in oil self-sufficiency rates and trust in the oil markets.[14] China's oil self-sufficiency rate is likely to keep declining unless there are major breakthroughs in oil E&P and/or transport fuelling technologies, or if its economy significantly worsens and hence curbing the demand for cars by its expanding middle class. If the latter happens, it would likely make the zero-sum form of economic nationalism more marketable and so erode decision-makers' trust in the international oil markets. Therefore, there seems to be no easy way to hasten China's oil sector liberalisation, but quite a few ways to slow it down.

The same observation of the relative importance of oil-sufficiency rate should have the opposite effect on the United States and other economies that can significantly enhance their oil self-sufficiency rates with technologies associated with the shale revolution. These technologies enabled the United States to increase its oil sufficiency rate from just shy of 40% in 2010 to 65% in 2015.[15] If everything remains equal, the United States should adopt a lower level of strategic oil supply measures. This was true in the form of the lifting of its four-decade export ban on crude oil in December 2015. Everything does not remain equal, however. Somehow the rhetoric of a more or less zero-sum form of economic nationalism has moved into mainstream politics in the United States, if not particularly in the oil sector. This simultaneous objective increase in oil supply security and subjective increase in general "paranoia" of U.S. decision-makers is likely to generate greater risk aversion of "managers" of polities not having friendly relations with the United States. In their estimation, the "prophecy" of the zero-sum economic nationalistic narrative is being fulfilled.

Whether the course of actions chosen by managers of individual firms or economies according to the subjective costs confronting them in the short run are sufficiently viable to ensure a long-term existence or even prosperity can only be known *ex post*. This is especially true when the economy in question is very large and hence has great market power. In this

[14] This is not to suggest that oil price itself has no effect on the level of strategic oil supply measures adopted by governments of net oil importing economies at all. It definitely does. For example, the Indian government has further relaxed oil product control since the drop of oil prices in the second half of 2014. Floating oil prices did not appear to be as politicised during the Taiwanese presidential election in 2016 as in the previous few elections when oil prices were high.

[15] Calculated with the data on the *BP Statistical Review of World Energy June 2016*, 8-9.

study, these are China, Japan, or India. One major factor that would contribute to where the population-of-states level long-term equilibrium of oil sector governance would be is how uniformly and quickly other oil importing economies around the world liberalise their oil sectors. Another factor is the pace of innovation and dissemination of cost-saving technologies and modes of exchange, including alternative energy technologies. The prevalence or change in dominant global economic-political ideas, such as being free-trade-oriented or protectionist, would also be pivotal.[16]

A more nuanced understanding of the two implicit assumptions underlying the puzzle of this thesis emerges after the research was carried out to explain it. The open market is indeed generally more efficient, but only in a long-term evolutionary sense and comparing to the modes of exchange of oil in previous eras. For the second assumption, states do generally aim at using the most efficient way to obtain oil supplies, especially in the long run, due to the pressure of trying to remain competitive at the global level. Most decision-makers, however, operate in a short to medium horizon. They are confronted with short-term subjective costs and risk perceptions, which may diverge at least temporarily from the states' long-term objectives.

The timeframe embodied within this study's research questions targets the medium-term and the geographic scope can also be described as "medium" – between the global population-of-states level and the level of individual economies. The operationalisation of the research, however, is at the individual economy level and the relatively short time of 10 years in each period. The reasoning of the vulnerability-interaction model also fits into the short to medium time horizon of typical decision-makers as trust and risk preference is hypothesised as the central explanatory variable through which all the other explanatory variables flow.

The puzzle that motivated this study can be unlocked by viewing it through the lenses of the two overlapping horizons and levels of analysis explained here. The increasing trading volume and sophistication of the international oil markets is a manifestation of the long-term "evolution" towards a more efficient mode of exchange in oil internationally and oil sector liberalisation domestically for the last four decades. The simultaneous adoption of various levels of strategic oil supply measures by different net oil importing states can be explained by the inherently subjective cost calculations of decision-makers of these states in the short to medium term. The vulnerability-interaction model projects the most important factors that feature in the decision-makers' calculation of what degree such measures should be adopted at any given time.

[16] For the first 80 years or so years of oil as a global commodity, for example, the "equilibrium" was intra-company transfers among "private" firms of colonial and dominant powers of the day.

Roughly analogous to Daniel Kahneman's assertion of the necessity of both the fast and slow modes of thinking for human decision-making and survival in *Thinking, Fast and Slow*, the two timeframes and speeds of oil sector liberalisation co-existed in the last 40 years. In the Asia Pacific, a region where multinational institutions have been relatively weak, cooperation among net oil importing states to optimise their market power and to establish stability of supply (reaping long-term benefits) was repeatedly countered by the instinct to compete and survive (dealing with short-term subjective costs and risk perceptions).[17] Yet, major regional conflicts over the acquisition of oil resources have been avoided in the region. With continued good fortunate, these asynchronous oil sector liberalisations will persist in moving towards a long-term equilibrium of ever greater efficiency and benefit to that region and to the world, perhaps even until the obsolescence of oil as a form of energy is reached.

Agenda for Future Research

With the understanding of the timeframe and level of analysis applicable to the vulnerability-interaction model as stated above, future research may further test its validity. Data from more net oil importing economies should be gathered first inside and then outside of the Asia Pacific in distinct periods after the establishment of the international oil market. The proportion of the economies which adopted a high, medium, or low level of strategic oil supply measures would provide better insights to the prevalence of these measures. Any temporal trend(s) and geographic pattern of state intervention in oil supply, if any, would become more discernible if enough cases are studied. The relatively small sample in this study shows that in the Asia Pacific, state intervention oil supply was still significant as of 2013 (33% of the cases at a high, 44% at a medium, and 22% at a low level or none at all).

The factors or combination of factors that led to the adoption of a high level of strategic oil supply measures in the new cases should be carefully analysed and compared to those stipulated in H3 and H4 of the vulnerability-interaction model to refine, modify, or refute these hypotheses. Any commonalities emerge as a result may augment the typologies of intervention in oil supply by net oil importing economies started in this study.

Last but not least, the validity of the underlying logic of the vulnerability-interaction model, namely the proposed causal relationships between the four explanatory factors with the level of strategic oil supply measures adopted, may be tested with the new

[17] A good example of these two countervailing forces at work in Asia is the sometimes-on-and-sometimes-off Five-Country Energy Ministerial China initiated in 2006 and the torturous paths of other energy initiatives in Northeast Asia. See Gaye Christoffersen, "Pathways to a Northeast Asian Energy Regime," in *China's Rise and Changing Order in East Asia*, ed. David Arase (New York: Palgrave, 2016), 173-196.

cases. One way to achieve this is to analyse pairs of cases that fit the parameters of H1 and H2.

The slump in oil prices since 2014 and the almost simultaneous rise in economic nationalism rhetoric in many parts of the world offer a great opportunity to study the cross-temporal validity of the logic of the vulnerability-interaction model. In particular, the preliminary insight of this study that change in oil prices only has a relatively small effect on the level of state intervention in oil supply compared to change in oil self-sufficiency rate and securitisation-induced lower trust in the oil market may be tested in the same net oil importing economies before and after these two benchmark events.

Appendix A
Typologising Adoption of High-Level State Intervention in Oil Supply

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With four explanatory variables at trichotomous levels, the vulnerability-interaction model would have generated 81 mathematically possible pathways or configurations of arriving at the adoption of a high level of strategic oil supply measures (3^4=81). The proposed model then specifies two *a prior* conditions for such a result. This shrinks the possible pathways or cells to 18 as presented in Figure 2.4 in Chapter Two. After applying the logical compression technique in Section 4.3, five more pathways or cells are deleted (See Figure 2.5). Thirteen pathways leading to a high level of DV remains with trichotomous variables. Each one of these pathways is hypothesised as an INUS cause of the adoption of a high level of strategic oil supply measures by an oil importing economy. These pathways are:

1. high capability + low trust + low private capital strength + low OV
2. high capability + low trust + low private capital strength + medium OV
3. high capability + low trust + low private capital strength + high OV
4. high capability + low trust + medium private capital strength + low OV
5. high capability + low trust + medium private capital strength + medium OV
6. high capability + low trust + medium private capital strength + high OV
7. high capability + medium trust + low private capital strength + low OV
8. high capability + medium trust + low private capital strength + medium OV
9. high capability + medium trust + low private capital strength + high OV
10. high capability + medium trust + medium private capital strength + low OV
11. high capability + medium trust + medium private capital strength + medium OV
12. high capability + medium trust + medium private capital strength + high OV
13. high capability + medium trust + high private capital strength + high OV

Then the technique of pragmatic compression is applied as explained in Chapter Two. This combines the components or "solution terms" of these pathways[1] if doing so does not change the essence of the model. A careful examination of the solution terms of the 13 pathways above shows that the first three pathways or solutions only differ in the level of their last component, which is OV. Therefore, the property space or cell of these three pathways can be pragmatically compressed as follows:

[1] In research using set-theoretic methods, each component in a pathway leading to the phenomenon of interest is called a solution term. See Schneider and Wagemann.

A. high capability + low trust + low private capital strength + noticeable level of OV

The same procedure can be carried out for pathways 4 to 6; 7 to 9; and 10 to 12. Each of these groups also only differs in the level of their last component, again the OV. This will result in the following collapsed pathways for each group respectively:

B. high capability + low trust + medium private capital strength + noticeable level of OV
C. high capability + medium trust + low private capital strength + noticeable OV
D. high capability + medium trust + medium private capital strength + noticeable OV

Now if we look at A to D more closely, we can see that the same pragmatic compression principle can be used to merge them into a single pathway as follows:

E. high capability + NOT high trust + NOT high private capital strength + noticeable OV

At the end, two final pathways or INUS causes to a high level of DV emerge with trichotomous variables after all the compression is done: pathway 13 and pathway E. They also become H3 and H4 respectively:

H3: high capability + medium trust + high private capital strength + high OV

H4: high capability + NOT high level of trust + NOT high private capital strength + noticeable level of OV

Figure A1 below is a graphic representation of the INUS causes for the adoption of a high level of strategic oil supply measures by net oil importing economies with trichotomous variables. The greyed out cells are logically compressed (equivalent to cell group 2 in Figure 2.5):

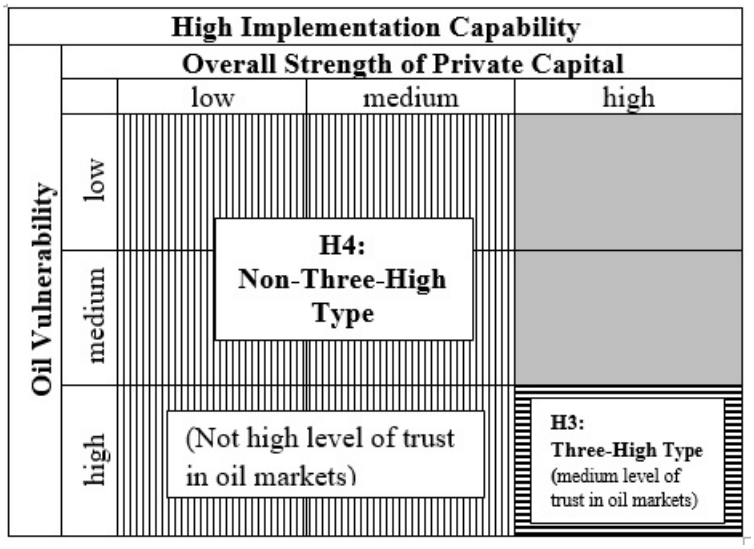

Figure A1 Typology of Adoption of High Level of Strategic Oil Supply Measures

Appendix B
Calculations for Plausibility Probe

Table A1 below shows different strategic oil supply indicator scores resulting from different aggregation of its two components methods with and without capping the SPR score and weighting given to it:

DV with 90 days of import as 100% of SPR for 2013, results of different weights of aggregation														
	% govt control of oil supply	SPR days	SPR %	SPR as 50%	SPR as 75%	capped at 100%	50% capped at 100	75% capped at 100	equal weight, no cap	equal weight, capped	75% no cap	75% capped	50% no cap	50% capped
China	99.00	17.00	18.89	9.44	14.17	18.89	9.44	14.17	58.94	58.94	56.58	56.58	54.22	54.22
India	44.72	1.00	1.11	0.56	0.83	1.11	0.56	0.83	22.92	22.92	22.78	22.78	22.64	22.64
Indonesia	100.00	47.00	52.22	26.11	39.17	52.22	26.11	39.17	76.11	76.11	69.58	69.58	63.06	63.06
Japan	11.00	84.00	93.33	46.67	70.00	93.33	46.67	70.00	52.17	52.17	40.50	40.50	28.83	28.83
Philippines	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.50	2.50	2.50	2.50	2.50	2.50
Singapore	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
South Korea	9.00	122.00	135.56	67.78	101.67	100.00	50.00	75.00	72.28	54.50	55.33	42.00	38.39	29.50
Taiwan	44.00	90.00	100.00	50.00	75.00	100.00	50.00	75.00	72.00	72.00	59.50	59.50	47.00	47.00
Thailand	42.00	23.00	25.56	12.78	19.17	25.56	12.78	19.17	33.78	33.78	30.58	30.58	27.39	27.39

Table A1 2013 DV scores of nine case-study economies with different aggregation methods and weightings

Table A2 below shows different trichotomous DV levels of all case studies in 2013 resulting from different aggregation and weighting methods of the two components of the strategic oil supply indicators. As a rule, for all weighting methods, DV scores within one standard deviation of the average (falling within 0.5 above and 0.5 below the mean DV score of the weighting method in question) are considered having a medium level. DV scores more than 0.5 standard deviation above the average are considered having a high level and those 0.5 or more below are considered having a low level.

DV equal weight				
China	58.94	0.52	43.38 (average)	high
India	22.64	-0.70	29.83 (standard deviation)	low
Indonesia	76.11	1.10		high
Japan	52.17	0.29		medium
Philippines	2.50	-1.37		low
Singapore	0.0-	-1.45		low
S. Korea	72.28	0.97		high
Taiwan	72.00	0.96		high
Thailand	33.78	-0.32		medium
DV equal weight SPR capped at 100%				
China	58.94	0.62	41.40 (average)	high
India	22.64	-0.66	28.23 (standard deviation)	low
Indonesia	76.11	1.23		high
Japan	52.17	0.38		medium
Philippines	2.50	-1.38		low
Singapore	0.00	-1.47		low
S. Korea	54.50	0.46		medium
Taiwan	72.00	1.08		high
Thailand	33.78	-0.27		medium
SPR 75% weight				
China	56.58	0.76	37.47 (average)	high
India	22.64	-0.59	25.26 (standard deviation)	low
Indonesia	69.58	1.27		high
Japan	40.50	0.12		medium
Philippines	2.50	-1.38		low
Singapore	0.00	-1.48		low
S. Korea	55.33	0.71		high
Taiwan	59.50	0.87		high
Thailand	30.58	-0.27		medium
SPR 75% weight capped at 100%				
China	56.58	0.84	35.99 (average)	high
India	22.64	-0.55	24.46 (standard deviation)	low
Indonesia	69.58	1.37		high
Japan	40.50	0.18		medium
Philippines	2.50	-1.37		low
Singapore	0.00	-1.47		low
S. Korea	42.00	0.25		medium
Taiwan	59.50	0.96		high
Thailand	30.58	-0.22		medium

SPR 50% weight			31.56 (average)	
China	54.22	1.05	21.61 (standard deviation)	high
India	22.64	-0.41		medium
Indonesia	63.06	1.46		high
Japan	28.83	-0.13		medium
Philippines	2.50	-1.34		low
Singapore	0.00	-1.46		low
S. Korea	38.39	0.32		medium
Taiwan	47.00	0.71		high
Thailand	27.39	-0.19		medium
SPR 50% weight with USA				
China	54.22	1.07	32.21 (average)	high
India	22.64	-0.47	20.48 (standard deviation)	medium
Indonesia	63.06	1.51		high
Japan	28.83	-0.17		medium
Philippines	2.50	-1.45		low
Singapore	0.00	-1.57		low
S. Korea	38.39	0.30		medium
Taiwan	47.00	0.72		high
Thailand	27.39	-0.24		medium
USA	38.06	0.29		medium
SPR 50%, capped at 100%				
China	54.22	1.10	30.57 (average)	high
India	22.64	-0.37	21.46 (standard deviation)	medium
Indonesia	63.06	1.51		high
Japan	28.83	-0.08		medium
Philippines	2.50	-1.31		low
Singapore	0.00	-1.42		low
S. Korea	29.50	-0.05		medium
Taiwan	47.00	0.77		high
Thailand	27.39	-0.15		medium

Table A2 Different trichotomous levels DV of nine case-study economies in 2013 with different aggregation and weighting methods

Table A3 in the next page shows the calculation of the oil vulnerability of all nine case-study economies in 2013. The sources of oil production, consumption, and primary energy consumption data are from *BP Statistical Review of World Energy June 2014* except stated otherwise. The Philippines' oil production amount is the from U.S. Energy Information Administration database online. Population and per capita income data are from the World Bank except for Taiwan, which is from the Central Intelligence Agency "The World Factbook."

2013	prodn Mton	consump Mton	oil self-sufficiency rate	sufficiency normalized	global import Mton	oil % as global import	primary energy consump Mtoe	oil as % of primary energy	prod K bbl	consump K bbl	Dubai crude US/bbl	population	per cap import cost	per cap GDP	import cost	OV
China	208.13	507.38	41.02	58.98	1878.30	15.93	2852.36	17.79	417.969	10756.41	105.47	1,357,380,000	0.3110	12,211	0.0042	23.18
India	41.96	175.25	23.94	76.06	1878.30	7.10	594.96	29.46	894.22	3726.57	105.47	1,252,139,596	0.2386	5,268	0.0045	28.15
Indonesia	42.70	73.83	57.84	42.16	1878.30	1.66	168.68	43.77	882.17	1622.66	105.47	249,865,631	0.3126	10,011	0.0031	21.90
Japan	0.00	208.92	0.00	100.00	1878.30	11.12	474.01	44.08	0.00	4550.56	105.47	127,338,621	3.7691	36,618	0.0103	38.80
Philippines	1.10	13.67	8.05	91.95	1878.30	0.67	31.77	43.03	0.00	297.66	105.47	98,393,574	0.3191	6,588	0.0048	33.91
Singapore	0.00	65.92	0.00	100.00	1878.30	3.51	75.67	87.12	0.00	1258.90	105.47	5,399,200	24.5918	80,780	0.0304	47.66
South Korea	0.00	108.45	0.00	100.00	1878.30	5.77	271.33	39.97	0.00	2459.86	105.47	50,423,955	5.1452	32,664	0.0138	36.44
Taiwan	0.00	43.39	0.00	100.00	1878.30	2.31	110.89	39.13	0.00	977.36	105.47	23,415,126	4.4024	43,600	0.0101	35.36
Thailand	16.63	50.41	32.99	67.01	1878.30	1.80	115.61	43.60	458.98	1211.14	105.47	67,010,502	1.1838	15,437	0.0077	28.11

Table A3 Calculation of 2013 OV

Figure A4 below lays out overall implementation scores and levels of nine case-study economies in 2013 with Singapore coded as anocracy, autocracy, or democracy. Singapore's overall implementation level does not change in these three scenarios, but Thailand's overall capability level would be downgraded to "low" instead of "medium" in the two scenarios not adopted in this study (Singapore being either an autocracy or democracy).

Overall financial & diplomatic capability without centralisation scores				
China	13	2.05	8.22 (average)	high
India	8	-0.10	2.33 (S.D.)	medium
Indonesia	6	-0.95		low
Japan	10	0.76		high
Philippines	5	-1.38		low
Singapore	8	-0.10		medium
South Korea	9	0.33		medium
Taiwan	8	-0.10		medium
Thailand	7	-0.52		medium
Centralisation Score with Singapore as anocracy			**autocracy**	**democracy**
China		3	3	3
India		2	2	2
Indonesia		2	2	2
Japan		2	2	2
Philippines		2	2	2
Singapore		1	3	2
South Korea		2	2	2
Taiwan		2	2	2
Thailand		2	2	2
Overall capability with diplomatic & centralisation scores, Singapore as anocracy				
China	16	2.19	10.22 (average)	high
India	10	-0.08	2.64 (S.D.)	medium
Indonesia	8	-0.84		low
Japan	12	0.67		high
Philippines	7	-1.22		low
Singapore	9	-0.46		medium
South Korea	11	0.30		medium
Taiwan	10	-0.08		medium
Thailand	9	-0.46		medium

Overall capability with diplomatic & centralisation scores, Singapore as democracy				
China	16	2.18	10.33 (average)	high
India	10	-0.13	2.60 (S.D.)	medium
Indonesia	8	-0.90		low
Japan	12	0.64		high
Philippines	7	-1.28		low
Singapore	10	-0.13		medium
South Korea	11	0.26		medium
Taiwan	10	-0.13		medium
Thailand	9	-0.51		low

Table A4 Overall implementation capability of nine economies in 2013, with different centralization scores

Table A5 below shows all 36 pairs of comparison of the variable levels among the nine case-study economies with 2013 data. The pairs with conditions fitting either H1 or H2 are highlighted. The rest have differences in more than one explanatory factor. The vulnerability-interaction model as is currently formulated cannot specify the interaction effect such situations would be on the DV level.

Economy	DV Level	OV (IV) Level	Strength of Private Capital	Overall Trust in Oil Markets	Overall Implementation Capability
China	High	Low	Low	Low	High
India	**Medium**	**Low**	**Low**	**Low**	**Medium**
Indonesia	High	Low	Medium	Low	Low
Japan	Medium	High	High	High	High
Philippines	Low	Medium	Medium	Medium	Low
Singapore	Low	High	High	High	Medium
S. Korea	Medium	Medium	Medium	High	Medium
Taiwan	High	Medium	High	High	Medium
Thailand	**Medium**	**Low**	**Low**	**Low**	**Medium**

Trichotomous Levels of All Variables for Nine Case-Study Economies in 2013 (same as Table 3.18)

1. China-India: one-level difference in one factor **congruent (H2)**
2. China-Indonesia: one-level difference in one factor and two-level difference in two factors
3. China-Japan: two-level difference in three factors
4. China-Philippines: one-level difference in three factors and two-level difference in one factor
5. China-Singapore: two-level difference in three factors and one-level difference in one factor
6. China-S. Korea: one-level difference in three factors and one level difference in one factor
7. China-Taiwan: one-level difference in two factors and two-level difference in two factors
8. China-Thailand: one-level difference in one factor **congruent (H2)**
9. India-Indonesia: one-level difference in two factors
10. India-Japan: two-level difference in three factors and one-level difference in one factor
11. India-Philippines: one-level difference in four factors
12. India-Singapore: two-level difference in three factors
13. India-S. Korea: one-level difference in two factors and two-level difference in one factor
14. India-Taiwan: one-level difference in one factor and two-level difference in two factors
15. India-Thailand: all four factors the same levels **congruent (H1)**
16. Indonesia-Japan: two-level difference in three factors and one-level difference in one factor
17. Indonesia-Philippines: one-level difference in two factors
18. Indonesia-Singapore: two-level difference in two factors and one-level difference in one factor
19. Indonesia-S. Korea: one-level difference in two factors and two-level difference in one factor
20. Indonesia-Taiwan: one-level difference in two factors, and two-level difference in two factors
21. Indonesia-Thai: one-level difference in two factors
22. Japan-Philippines: one-level difference in three factors and two-level difference in one factor
23. Japan-Singapore: one-level difference in one factor **congruent (H2)**
24. Japan-S. Korea: one-level difference in three factors
25. Japan-Taiwan: one-level difference in two factors
26. Japan-Thai: one-level difference in one factor and two-level difference in three factors
27. Philippines-Singapore: one-level difference in four factors
28. Philippines -S. Korea: one-level difference in two factors
29. Philippines -Taiwan: one-level difference in three factors
30. Philippines -Thailand: one-level difference in four factors
31. Singapore-S. Korea: one-level difference in two factors
32. Singapore-Taiwan: one-level difference in one factor **incongruent (H2)**
33. Singapore-Thailand: two-level difference in three factors
34. S. Korea-Taiwan: one-level difference in one factor **incongruent (H2)**
35. S. Korea-Thailand: one-level difference in two factors and two-level difference in one factor
36. Taiwan-Thailand: one-level difference in one factor and two-level difference in two factors

Table A5 36 paired-comparisons of variable levels of nine case-study economies in 2013

Table A6 below shows the average government ownership shareholding in 15 advanced industrialised economies by 2005. Source of the information is mainly from "Appendix: Oil market liberalization in the advanced industrialised states" in Llewelyn Hughes, *Globalizing Oil: Firms and Oil Market Governance in France, Japan, and the United States*. I use the state control of crude oil supply figure in this study for Japan since Japan's "NOC" is more a government agency facilitating loans for private oil firms to develop oil.

Country	% state shareholding in NOC(s)	Note
Austria	31.50	as of 2007
Belgium	0.00	as of 1983
Finland	61.00	as of 2000
France	0.00	as of 2000
Germany	0.00	subsidy provision ended in 1989
Greece	35.40	as of 2004
Ireland	0.00	as of 2001
Italy	30.8	as of 2000
Japan	11.00	use figure in this plausibility probe
Netherland	0.00	
Portugal	34.80	as of 2000
Spain	0.00	but govt retained "golden share" as of 1998
Sweden	0.00	as of 1994
Switzerland	0.00	
Turkey	85.00	average of 100% of upstream NOC as of 2005 and 68.8% downstream NOC
15-economy average	**19.30**	

Table A6 Government shareholding in NOCs in 15 advanced industrialised countries by 2005

Table A7 below shows the calculation of the oil vulnerability of all nine case-study economies in 2003. The sources of oil production, consumption, and primary energy consumption data are from *BP Statistical Review of World Energy June 2004* except stated otherwise. The Philippines' oil production amount is the from U.S. Energy Information Administration database online. Population and per capita income data are from the World Bank except for Taiwan, which is from the Central Intelligence Agency "The World Factbook."

2003	prod Mton	consump Mton	oil self-sufficiency rate	oil self-sufficiency rate normalized	global import Mton	%as global import	primary energy consup Mtoe	oil as % of primary energy	prod K bbl	consump K bbl	Brent crude US/bbl	population	per cap import cost	per cap GDP	import cost	OV
China	169.59	271.72	62.41	37.59	1770.00	5.77	1254.25	21.66	3405.69	5771.46	36.50	1288400000	0.07	3933.60	0.0017	16.26
India	37.35	116.46	32.07	67.93	1770.00	4.47	320.84	36.30	802.73	2485.27	36.50	1108369577	0.06	2361.30	0.0023	27.17
Indonesia	57.64	57.94	99.48	0.52	1770.00	0.02	117.05	49.50	1175.55	1222.24	36.50	220307809	0.01	3311.40	0.0001	12.51
Japan	0.00	231.90	0.00	100.00	1770.00	14.23	514.40	48.97	0.00	3456.16	36.50	127718000	1.36	27941.20	0.0056	40.80
Philippines	0.70	15.49	4.52	95.48	1770.00	0.84	26.26	58.99	0.00	328.50	36.50	82971734	0.14	3731.70	0.0039	38.83
Singapore	0.00	35.42	0.00	100.00	1770.00	2.00	39.29	90.15	0.00	688.04	36.50	4114800	6.10	45768.30	0.0133	48.04
S. Korea	0.00	106.37	0.00	100.00	1770.00	6.01	209.77	50.71	0.00	2340.33	36.50	47859311	1.78	21389.20	0.0083	39.18
Taiwan	0.00	47.50	0.00	100.00	1770.00	2.68	99.68	47.65	0.00	1011.91	36.50	23500000	1.57	24461.51	0.0064	37.59
Thailand	9.54	38.33	24.89	75.11	1770.00	1.63	75.40	50.84	244.27	843.59	36.50	64817254	0.34	8820.00	0.0038	31.89

Table A7 Oil Vulnerability of Nine Case Studies in 2003

Table A8 below shows the DV calculation and sources for the nine case-study economies in 2003.

2003	% govt control of oil supply	SPR days	SPR %	DV Score with SPR 50% weight, no cap
China	99.00	1.00	1.11	49.78
India	47.74	1.00	1.11	24.15
Indonesia	100.00	200.00	222.22	105.56
Japan	11.00	84.00	93.33	28.83
Philippines	2.55	0.00	0.00	1.28
Singapore	0.00	0.00	0.00	0.00
South Korea	1.73	49.00	54.44	14.48
Taiwan	78.00	90.00	100.00	64.00
Thailand	71.00	32.00	35.56	44.39

All Chinese oil importers were 100% state-owned in 2003.

Source of Indian government control of oil supply are calculated from the government shareholding of the same five NOCs listed in Chapter Three, with their respective production or refining amount from their respective annual reports of relevant years.

Source of Japan's "self-developed" oil figure in 2003: Koike, Masanari et al., "Overseas Oil Development policy of Resource Poor Countries: A Case Study from Japan." Energy Policy 36 (2008), 1767.

Source of the Philippines' oil production is from the U.S. Energy Information Agency website. The amount is multiplied by 60% (its share of oil developed in the country).

The Singapore government had divested all its shares in SPC Limited already by 2003.

Source of South Korea's NOC production figure: KNOC Annual Report 2005, 15.

Source of Taiwan's government control figure is from CPC 2007 Sustainability Report (in Chinese), 10. (which gives 2006 figures and that's the closest year I can retrieve).

Source of Thailand's NOC production and procurement figure: PTT 2003 Annual Report, 62.

Indonesia's SPR figure calculated from 20days times the country's self-sufficiency rate in 2003 of about 90%.

Japan and South Korea's SPR figures are from Shin, Eui-Soon. "Joint Stockpiling and Emergency Sharing of Oil: Update on Situations in the ROK and on Arrangements for Regional Cooperation in Northeast Asia." Powerpoint presented at the Asian Energy Security Workshop May 13 -16, 2005, Beijing China.

Source of Taiwan's SPR in 2003 same as source in 2013.

Source of Thailand's SPR figure: Since 2001, oil importers had to stockpile no less than 36 days equivalent of sales. See Poonpat Leesombatpiboon, "Thailand's Energy Security: Strategic Petroleum Reserve and Its Economic Impacts" (PhD diss., George Washington University, 2010) 151. The 36 days figure is multiplied by 0.99 (for the 69.28% government shareholding of PTT in 2003 and then divided by 0.777 (Thailand imported 77% of its oil that year).

Table A8 DV calculation of nine case studies 2003

Table A9 below shows the calculation of the levels of all the variables of nine case studies in 2003.

2003	IEF with 2003 data	EFW with 2003 data (adjusted)	combined economic freedom score	
China	52.5	60	56.25	
India	51.5	64	57.75	
Indonesia	52.1	61	56.55	
Japan	64.3	72	68.15	
Philippines	59.1	66	62.55	
Singapore	88.9	85	86.95	
S. Korea	67.8	70	68.90	
Taiwan	69.6	73	71.30	
Thailand	63.7	66	64.85	
combined economic freedom score				
China	56.25	-1.00	65.92 (average)	low
India	57.75	-0.85	9.65 (S.D.)	low
Indonesia	56.55	-0.97		low
Japan	68.15	0.23		medium
Philippines	62.55	-0.35		medium
Singapore	86.95	2.18		high
S. Korea	68.90	0.31		medium
Taiwan	71.30	0.56		high
Thailand	64.85	-0.11		medium
DV equal weight				
China	50.06	-0.02	51.11 (average)	medium
India	24.43	-0.54	49.85 (S.D.)	low
Indonesia	161.11	2.21		high
Japan	52.72	0.03		medium
Philippines	1.28	-1.00		low
Singapore	0.00	-1.03		low
S. Korea	28.09	-0.46		medium
Taiwan	89.00	0.76		high
Thailand	53.26	0.04		medium
DV equal weight SPR capped at 100%				
China	50.06	-0.02	51.11 (average)	medium
India	24.43	-0.54	49.85(S.D.)	low
Indonesia	161.11	2.21		high
Japan	52.72	0.03		medium
Philippines	1.28	-1.00		low
Singapore	0.00	-1.03		low
S. Korea	28.09	-0.46		medium
Taiwan	89.00	0.76		high
Thailand	53.26	0.04		medium

SPR 75% weight				
China	49.92	0.14	44.04 (average)	medium
India	24.29	-0.48	41.49 (S.D.)	medium
Indonesia	133.33	2.15		high
Japan	40.92	-0.08		medium
Philippines	1.28	-1.03		low
Singapore	0.00	-1.06		low
S. Korea	21.28	-0.55		low
Taiwan	76.50	0.78		high
Thailand	48.82	0.12		medium
SPR 75% weight capped at 100%				
China	49.92	0.10	45.94 (average)	medium
India	24.29	-0.53	40.70 (S.D.)	low
Indonesia	133.33	2.15		high
Japan	40.92	-0.12		medium
Philippines	1.28	-1.10		low
Singapore	0.00	-1.13		low
S. Korea	38.37	-0.19		medium
Taiwan	76.50	0.75		high
Thailand	48.82	0.07		medium
SPR 50% weight, no cap				
China	49.78	0.38	36.97 (average)	medium
India	24.15	-0.38	33.59 (S.D.)	medium
Indonesia	105.56	2.04		high
Japan	29.11	-0.23		medium
Philippines	1.28	-1.06		low
Singapore	0.00	-1.10		low
S. Korea	14.48	-0.67		low
Taiwan	64.00	0.80		high
Thailand	44.38	0.22		medium
SPR 50%, capped at 100%				
China	49.78	0.35	38.24 (average)	medium
India	24.15	-0.43	32.84 (S.D.)	medium
Indonesia	105.56	2.05		high
Japan	29.11	-0.28		medium
Philippines	1.28	-1.13		low
Singapore	0.00	-1.16		low
S. Korea	25.87	-0.38		medium
Taiwan	64.00	0.78		high
Thailand	44.38	0.19		medium

OV							
China	16.26	-1.37	32.47 (average)	low			
India	27.17	-0.45	11.80 (S.D.)	medium			
Indonesia	12.51	-1.69		low			
Japan	40.80	0.71		high			
Philippines	38.83	0.54		high			
Singapore	48.04	1.32		high			
S. Korea	39.18	0.57		high			
Taiwan	37.59	0.43		medium			
Thailand	31.89	-0.05		medium			
% of urban population					**score**	**total domestic context score**	
China	40	-0.74	58.67 (average)	low	1	1	
India	29	-1.18	25.11 (S.D.)	low	1	1	
Indonesia	44	-0.58		low	1	1	
Japan	83	0.97		high	3	3	
Philippines	47	-0.46		medium	2	1.5	
Singapore	100	1.65		high	3	3	
S. Korea	81	0.89		high	3	2.5	
Taiwan	69	0.41		medium	2	2.5	
Thailand	35	-0.94		low	1	1.5	
source of urban population except Taiwan: http://data.worldbank.org/indicator/SP.URB.TOTL.IN.ZS?locations=TH							
source of Taiwan urban population: social indicator 2005, page 166							
per capita GDP					score		
China	3,934	-0.81	15966.00 (average)	low	1		
India	2,361	-0.91	14899.04 (S.D.)	low	1		
Indonesia	5,311	-0.72		low	1		
Japan	27,941	0.80		high	3		
Philippines	3,732	-0.82		low	1		
Singapore	45,744	2.00		high	3		
S. Korea	21,389	0.36		medium	2		
Taiwan	24,462	0.57		high	3		
Thailand	8,820	-0.48		medium	2		
source of Taiwan GDP: https://knoema.com/atlas/Taiwan-Province-of-China/GDP-per-capita-PPP-based							
source of per capita GDP except Taiwan: http://data.worldbank.org/indicator/NY.GDP.PCAP.PP.CD?locations=CN&view=chart							
overall trust in oil market					**securitizing agent**	**US relations**	
China	3	-1.41	5.56 (average)	low	1	1	
India	4	-0.86	1.81 (S.D.)	low	1	2	
Indonesia	4	-0.86		low	1	2	
Japan	8	1.35		high	2	3	
Philippines	5.5	-0.03		medium	1	3	
Singapore	8	1.35		high	3	2	
S. Korea	6.5	0.52		high	1	3	
Taiwan	6.5	0.52		high	1	3	
Thailand	4.5	-0.58		low	1	2	

forex reserves							
China	$416,199,000,000	1.03	191600777777 (average)	high	3		
India	$103,737,000,000	-0.40	217245918531 (S.D.)	medium	2		
Indonesia	$36,256,000,000	-0.72		low	1		
Japan	$673,554,000,000	-0.17		medium	2		
Philippines	$17,084,000,000	-0.80		low	1		
Singapore	$97,743,000,000	-0.43		medium	2		
S. Korea	$155,472,000,000	-0.17		medium	2		
Taiwan	$182,200,000,000	-0.04		medium	2		
Thailand	$42,162,000,000	-0.69		low	1		
source except Taiwan: http://data.worldbank.org/indicator/FI.RES.TOTL.CD							
nominal GDP							
China	$1,650,000,000,000	0.53	937987034722 (average)	high	3		
India	$618,356,000,000	-0.24	1353102968482 (S.D.)	medium	2		
Indonesia	$234,772,000,000	-0.52		low	1		
Japan	$4,303,000,000,000	2.49		high	3		
Philippines	$83,908,000,000	-0.63		low	1		
Singapore	$97,001,000,000	-0.62		low	1		
S. Korea	$680,521,000,000	-0.19		medium	2		
Taiwan	$622,044,312,500	-0.23		medium	2		
Thailand	$152,281,000,000	-0.58		low	1		
source of Taiwan GDP (St. Louis federal reserve bank economic research): https://fred.stlouisfed.org/series/RGDPNATWA666NRUG							
source of GDP except taiwan: http://data.worldbank.org/indicator/NY.GDP.MKTP.CD							
credit worthiness							
China	7.67	-0.15	8.41 (average)	medium	2	high=-0.6 or lower	
India	11.67	0.66	4.92 (S.D.)	low	1	low=+0.6 or higher	
Indonesia	18.00	1.95		low	1		
Japan	4.33	-0.83		high	3		
Philippines	11.00	0.53		low	1		
Singapore	1.33	-1.44		high	3		
S. Korea	6.67	-0.35		medium	2		
Taiwan	5.00	-0.69		high	3		
Thailand	10.00	0.32		medium	2		
overall financial capability							
China	8	1.26	5.56 (average)	high			
India	5	-0.29	1.94 (S.D.)	medium			
Indonesia	3	-1.31		low			
Japan	8	1.26		high			
Philippines	3	-1.31		low			
Singapore	6	0.23		medium			
S. Korea	6	0.23		medium			
Taiwan	7	0.74		high			
Thailand	4	-0.80		low			

diplomatic capability					centralization scores - Singapore as		
China	4	1.92	2.33 (average)	high	3		
India	2	-0.38	0.87 (S.D.)	high	2		
Indonesia	2	-0.38		med	2		
Japan	2	-0.38		med	2		
Philippines	2	-0.38		med	2		
Singapore	3	0.77		high	1		
S. Korea	3	0.77		high	2		
Taiwan	1	-1.54		low	2		
Thailand	2	-0.38		med	2		
source of Singapore's 2001-02 UNSC non-permanent membership: https://www.mfa.gov.sg/content/mfa/international_organisation_initiatives/unsc.html							
overall capability with diplomatic & centralization scores							
China	15	1.99	9.89 (average)	high			
India	9	-0.35	2.57 (S.D.)	medium			
Indonesia	7	-1.12		low			
Japan	12	0.82		high			
Philippines	7	-1.12		low			
Singapore	10	0.04		medium			
S. Korea	11	0.43		medium			
Taiwan	10	0.04		medium			
Thailand	8	-0.73		low			

Table A9 Calculation of levels of variables of nine case studies in 2003

Appendix C
Calculations for Paired Comparisons

Table A10 below shows the sources of crude oil supply of India in 2013 and the calculation of the supply concentration risk associated with it:

Country	% of Import	Country Risk at Feb 2014	Normalized country risk	Import risk	Concentration
Angola	4.50%	70.8	29.2	1.31	1.73
Cameroon	0.17%	66.5	33.5	0.06	0.00
Algeria	0.25%	71.3	28.7	0.07	0.01
Egypt	1.40%	57.8	42.2	0.59	0.35
Gabon	0.56%	72.5	27.5	0.15	0.02
Guinea	0.34%	44.8	55.2	0.19	0.04
Equatorial Guinea	0.33%	61.53	38.47	0.13	0.02
Libya	0.58%	61	39	0.23	0.05
Nigeria	8.80%	64.3	35.7	3.14	9.87
Sudan	0.18%	44.8	55.2	0.10	0.01
Chad	0.07%	61.5	38.5	0.03	0.00
UAE	8.30%	83.5	16.5	1.37	1.88
Azerbaijan	0.80%	75	25	0.20	0.04
Bhrain	0.13%	70	30	0.04	0.00
Brunei	0.55%	87.3	12.7	0.07	0.00
Iran	5.40%	63	37	2.00	3.99
Iraq	14%	63	37	5.18	26.83
Kazakhstan	0.17%	71.3	28.7	0.05	0.00
Kuwait	11%	81.3	18.7	2.06	4.23
Malaysia	1.40%	77.5	22.5	0.32	0.10
Oman	1.00%	81.5	18.5	0.19	0.03
Qatar	2.70%	82	18	0.49	0.24
Saudi Arabia	21%	80.8	19.2	4.03	16.26
Turkey	0.17%	59.3	40.7	0.07	0.00
Yemen	0.33%	62.3	37.7	0.12	0.02
Albanbia	0.09%	67.8	32.2	0.03	0.00
Russia	0.06%	69.5	30.5	0.02	0.00
Bahamas	0.06%	75.3	24.7	0.02	0.00
Mexico	2.40%	72.8	27.2	0.65	0.43
Australia	0.21%	77.8	22.2	0.05	0.00
Brazil	1.20%	69.3	30.7	0.37	0.14
Colombia	2.20%	68.3	31.7	0.70	0.49
Ecuador	0.20%	67.3	32.7	0.07	0.00
Venezuela	9.90%	54.3	45.7	4.52	20.47
				0.84	**87.24**
Data source of crude oil import countries and percentages:					
AJG Simoes, CA Hidalgo. The Economic Complexity Observatory: An Analytical Tool for Understanding					
the Dynamics of Economic Development. Workshops at the Twenty-Fifth AAAI Conference on Artificial Intelligence. (2011)					
http://atlas.media.mit.edu/en/visualize/tree_map/hs92/import/ind/show/2709/2013/					
Data source of country risks: ICRG website. Accessed 1 November 2016, http://epub.prsgroup.com/icrg-tables					
The risks for Chad and E. Guinea is obtained by averaging the other nine African countries which risks were assessed by ICRG					

Table A10 India's crude oil source concentration risk in 2013

Table A11 below shows the sources of crude oil supply of Thailand in 2013 and the calculation of the supply concentration risk associated with it:

Country	% of Import	Country Risk at Feb 2014	Normalized country risk	Import risk	Concentration
Angola	0.49%	70.8	29.2	0.14	0.02
Algeria	0.71%	71.3	28.7	0.20	0.04
Equatorial Guinea	0.16%	66.74	33.26	0.05	0.00
Libya	0.19%	61	39	0.07	0.01
Nigeria	0.59%	64.3	35.7	0.21	0.04
South Africa	0.06%	66.3	33.7	0.02	0.00
UAE	42%	83.5	16.5	6.93	48.02
Azerbaijan	4.90%	75	25	1.23	1.50
Brunei	1.40%	87.3	12.7	0.18	0.03
Indonesia	4.00%	65.5	34.5	1.38	1.90
South Korea	0.29%	82	18	0.05	0.00
Kuwait	0.93%	81.3	18.7	0.17	0.03
Myanmar	0.17%	62.8	37.2	0.06	0.00
Malyasia	5.40%	77.5	22.5	1.22	1.48
Oman	5.20%	81.5	18.5	0.96	0.93
Phililppines	0.23%	71.8	28.2	0.06	0.00
Qatar	4.80%	82	18	0.86	0.75
Saudi Arabia	17%	80.8	19.2	3.26	10.65
Singapore	0.07%	87.3	12.7	0.01	0.00
Timor-Leste	0.48%	75.025	24.975	0.12	0.01
Turkey	0.00%	59.3	40.7	0.00	0.00
Vietnam	0.27%	66	34	0.09	0.01
Yemem	4.00%	62.3	37.7	1.51	2.27
UK	0.17%	76.5	23.5	0.04	0.00
Norway	0.13%	90.8	9.2	0.01	0.00
Russia	2.80%	69.5	30.5	0.85	0.73
USA	0.09%	75.3	24.7	0.02	0.00
Australian	3.10%	77.8	22.2	0.69	0.47
New zealand	0.08%	82.8	17.2	0.01	0.00
Papua New Guinea	0.30%	60.3	39.7	0.12	0.01
				0.69	**68.94**
Data source of crude oil import countries and percentages:					
AJG Simoes, CA Hidalgo. The Economic Complexity Observatory: An Analytical Tool for Understanding					
the Dynamics of Economic Development. Workshops at the Twenty-Fifth AAAI Conference on Artificial Intelligence. (2011)					
http://atlas.media.mit.edu/en/visualize/tree_map/hs92/import/tha/show/2709/2013/					
The risk of Equatorial Guinea is the average of the other 5 African sources (not provided by ICRG)					
The risk of Timor-Lest (not provided by ICRG) is the average of the other 8 countries in Far East:					
Brunei, Indonesia, S. Korea, Myanmar, Malaysia, the Philippines, Singapore, and Vietnam					

Table A11 Thailand's crude oil source concentration risk in 2013

Table A12 below compares the profitability between Indian and Thai NOCs between 2009 and 2013:

NOC	net profit (million rupee)	source	net profit US$ (million)	source				net profits/equity ratio (%)	source
ONGC 12-13	209,257	p13 12-13 AR	3,820.00	*				17	p32 12-13 AR
ONGC 11-12	251,229	ditto	4,670.99	ditto				22.5	ditto
ONGC 10-11	189,240	ditto	4,193.61	ditto				19.6	ditto
ONGC 09-10	167,676	ditto	3,600.55	ditto				19.4	ditto
ONGC 08-09	161,263	ditto	3,282.11	ditto				20.7	p33 12-13 AR
5-yr average			**$3,913.45**					**19.84**	
IOCL 12-13	50,050	p23 12-13 AR	919	p23 12-13 AR				8.41	p24 2012-13 AR
IOCL 11-12	39,550	ditto	825	ditto				6.99	ditto
IOCL 10-11	74,450	p27 2010-11 AR	1,633	p27 2010-11 AR				14.06	p28 IOCL 2010-11 AR
IOCL 09-10	102,110	ditto	2,154	ditto				21.62	ditto
IOCL 08-09	29,500	p23 IOCL 09-10 AR	641	p23 IOCL 09-10 AR				6.93	ditto
5-yr average			**$1,234**					**11.60**	
							equity or after tax profit/average net worth (%)		source
Bharat 12-13	19,361.50	p16 Bharat 12-13 AR	353.50	*				16.80	p110 Bharat 13-14 AR
Bharat 11-12	8,512.80	p16 Bharat 11-12 AR	158.20	*				9.10	ditto
Bharat 10-11	17,420.60	ditto	386.05	*				11.40	ditto
Bharat 09-10	17,199.80	p16 Bharat 09-10 AR	369.34	*				12.20	ditto
Bharat 08-09	7,241.30	ditto	147.38	*				6.20	ditto
5-yr average			**$282.89**					**11.14**	
					net worth (million rupees)				
Hindustan 12-13	9,047.10	p11 Hindustan 12-13 AR	166.64	p11 Hindustan 12-13 AR	137,264.00	p11 Hindustan 12-13 AR		6.59	
Hindustan 11-12	9,114.30	ditto	179.00	p11 Hindustan 11-12 AR	131,225.20	p11 Hindustan 11-12 AR		6.95	
Hindustan 10-11	15,390.10	ditto	341.00	p13 Hindustan 2010-11 AR	125,458.00	p13 Hindustan 2010-11 AR		12.27	
Hindustan 09-10	13,013.70	ditto	287.00	p12 Hindustan 2009-10 AR	115,579.70	p12 Hindustan 2009-10 AR		11.26	
Hindustan 08-09	5,749.80	p13 Hindustan 2008-09 AR	112.00	p13 Hindustan 2008-09 AR	107,306.30	p13 Hindustan 2008-09 AR		5.36	
			$217.13					**8.48**	
Oil India 2013	35,893.40	p11 Oil India 2013-14 AR	655.33	*					
Oil India 2012	34,469.20	p22 Oil India 2012-13 AR	640.69	*					
Oil India 2011	38,951.00	p7 Oil India 2010-11 AR	863.17	*					
Oil India 2010	43,132.00	p7 Oil India 2010-11 AR	926.18	*					
Oil India 2009	21,616.80	p9 Oil India 2008-09 AR	439.96	*					
5-yr average			**$705.07**					**12.77**	
Indian NOCs 5-yr average			**$6,352.94**						
	net profit (million Baht)	**source**	**net profits US$ (million)**	**source of D**	**equity**	**source**		**net profits/equity ratio (%)**	**source**
PTT 2013	94,652	p12 PTT 2013 AR	3,100.27	*	823,178	p12 PTT 2013 AR		11.50	p12 PTT 2013 AR
PTT 2012	104,608	ditto	3,375.76	ditto	729,896	ditto		14.33	ditto
PTT 2011	106,260	ditto	3,549.19	ditto	643,713	ditto		16.51	ditto
PTT 2010	59,548	p13 of PTT 2011AR	1,794.19	ditto	557,414	p13 of PTT 2011AR		10.68	p13 of PTT 2011 AR
PTT 2009	83,992	ditto	2,457.11	ditto	498,091	ditto		16.86	ditto
5-yr average			**$2,855**					**13.98**	
			44.94	Thailand's % of net profit of India's	2.224960985				

* https://www.oanda.com/currency/converter/
date of exchange rate set on 1 Jan of the year in question, such as 1 Jan 2013, 12 etc.

Table A12 Indian and Thai NOC profitability between 2009 and 2013

Table A13 below shows the sources of crude oil supply of China in 2013 and the calculation of the supply concentration risk associated with it:

Country	% of Import	Country Risk at Feb 2014	Normalized country risk	Import risk	Concentration
Angola	14%	70.80	29.20	4.09	16.71
Democratic Rep. of Congo	0.40%	65.00	35.00	0.14	0.02
Republic of Congo	2.40%	65.00	35.00	0.84	0.71
Algeria	0.74%	71.30	28.70	0.21	0.05
Egypt	0.43%	57.80	42.20	0.18	0.03
Gabon	0.17%	72.50	27.50	0.05	0.00
Ghana	0.14%		100.00	0.14	0.02
Equatorial Guinea	0.87%	61.53	38.47	0.33	0.11
Libya	0.91%	61.00	39.00	0.35	0.13
Mauritania	0.05%	65.00	35.00	0.02	0.00
Nigeria	0.45%	64.30	35.70	0.16	0.03
Sudan	0.87%	44.80	55.20	0.48	0.23
South Sudan	1.10%	60.00	40.00	0.44	0.19
Chad	0.04%	61.53	38.47	0.02	0.00
United Arab Emirates	3.80%	83.50	16.50	0.63	0.39
Azerbanjan	0.03%	75.00	25.00	0.01	0.00
Brunei	0.04%	87.30	12.70	0.01	0.00
Indonesia	0.20%	65.50	34.50	0.07	0.00
Iran	7.60%	63.00	37.00	2.81	7.91
Iraq	8.10%	63.00	37.00	3.00	8.98
Kazakhstan	4.40%	71.30	28.70	1.26	1.59
Kuwait	3.30%	81.30	18.70	0.62	0.38
Mongolia	0.25%	77.50	22.50	0.06	0.00
Malaysia	0.20%	77.50	22.50	0.05	0.00
Oman	9.00%	81.50	18.50	1.67	2.77
Philippines	0.03%	71.80	28.20	0.01	0.00
Qatar	0.05%	82.00	18.00	0.01	0.00
Saudi Arabia	19%	80.80	19.20	3.65	13.31
Singpaore	0.00%	87.30	12.70	0.00	0.00
Thailand	0.22%	66.00	34.00	0.07	0.01
Vietnam	0.28%	66.00	34.00	0.10	0.01
Yemen	0.81%	62.30	37.70	0.31	0.09
UK	0.14%	76.50	23.50	0.03	0.00
Russia	9.30%	69.50	30.50	2.84	8.05
Canada	0.08%	78.00	22.00	0.02	0.00
Cuba	0.03%	66.00	34.00	0.01	0.00
Mexico	0.34%	72.80	27.20	0.09	0.01
Australia	0.89%	77.80	22.20	0.20	0.04
Argentina	0.36%	73.00	27.00	0.10	0.01
Brazil	2.00%	69.30	30.70	0.61	0.38
Colombia	2.20%	68.30	31.70	0.70	0.49
Ecuador	0.16%	67.30	32.70	0.05	0.00
Venezuela	4.50%	54.30	45.70	2.06	4.23
				0.66	**66.88**
Data source of crude oil import countries and percentages:					
AJG Simoes, CA Hidalgo. The Economic Complexity Observatory: An Analytical Tool for Understanding the					
Dynamics of Economic Development. Workshops at the Twenty-Fifth AAAI Conference on Artificial Intelligence. (2011)					
http://atlas.media.mit.edu/en/visualize/tree_map/hs92/import/chn/show/2709/2013/					
Data source of country risks: ICRG website. Accessed 1 November 2016, http://epub.prsgroup.com/icrg-tables					

Table A13 China's crude oil source concentration risk in 2013

Table A14 below shows the calculation of the net profits of the publicly-listed subsidiaries of the three major Chinese NOCs between 2009 and 2013:

NOC	Net profit (after tax) million RMB	source	Net profit (after tax) million US$	source
Petrochina 2013	142,274	p6 2013 PetroChina A.R.	$22,561.10	*
Petrochina 2012	130,620	ditto	$20,638.30	*
Petrochina 2011	145,959	ditto	$22,145.20	*
Petrochina 2010	150,792	ditto	$22,087.90	*
Petrochina 2009	106,559	ditto	$15,639.90	*
		Five-Year Average:	$20,614.48	*
NOC	**"net profit attributable to equity shareholders of the company excluding extraordinary gain and loss" million RMB**	**source**	**Net profit (after tax) million US$**	**source**
Sinopec Corp. 2013	66,658	p6 2013 Sinopec Corp. A.R.	$10,570.30	*
Sinopec Corp. 2012	61,922	ditto	$9,783.85	*
Sinopec Corp. 2011	70,456	ditto	$10,689.70	*
Sinopec Corp. 2010	68,345	p5 2010 Sinopec Corp. A.R.	$10,011.10	*
Sinopec Corp. 2009	61,258	ditto	$8,990.94	*
		Five-Year Average:	$10,009.18	*
NOC	**net profit million RMB**	**source**	**net profit million US$**	**source**
CNOOC Ltd. 2013	56,461	p61 2013 CNOOC Ltd. A.R.	$9,110.30	p61 2013 CNOOC Ltd. A.R.
CNOOC Ltd. 2012	63,691	ditto	$10,063.40	*
CNOOC Ltd. 2011	70,260	p9 2011 CNOOC Ltd. A.R.	$10,660.00	*
CNOOC Ltd. 2010	54,409.50	p52 2010 CNOOC Ltd. A.R.	$8,030.40	p52 2010 CNOOC Ltd. A.R.
CNOOC Ltd. 2009	29,490	p6 2009 CNOOC Ltd. A.R.	$5,796.02	*
		Five-Year Average:	$8,732.02	*
		Grand total:	**$39,355.68**	
* all US$ conversion done through https://www.oanda.com/currency/converter/,				
using 1 January of the year in question for the historical exchange rates.				

Table A14 Chinese NOC profitability 2009-2013

Table A15 below shows the calculation of China's official diplomatic spending between 2009 and 2013:

Year	Budget for all diplomatic activities of MFA, PRC (in RMB)	source	Budget for all diplomatic activities of MFA, PRC (in million US$)	Budget for entire MFA (including housing, education etc.) (in RMB)	Budget for entire MFA (including housing, education etc.) (in million US$)
2013	6,341,581,700	http://www.fmprc.gov.cn/web/wjb_673085/zfxxgk_674865/xxgkml_674869/ysxxl_674871/t1032487.shtml	$1,005.620	6,931,681,700	$1,099.190
2012	5,284,630,000	http://www.fmprc.gov.cn/web/wjb_673085/zzjg_673183/cws_674721/xgxx_674723/t1059850.shtml	$834.987	5,816,279,800	$918.989
2011	5,550,206,700	http://www.fmprc.gov.cn/web/wjb_673085/zfxxgk_674865/xxgkml_674869/ysxxl_674871/t953205.shtml	$842.089	6,166,093,400	$935.532
2010	4,737,631,500	http://www.fmprc.gov.cn/web/wjb_673085/zfxxgk_674865/xxgkml_674869/ysxxl_674871/	$693.965	6,694,192,900	$980.56
2009	5,011,329,500	http://www.fmprc.gov.cn/web/wjb_673085/zfxxgk_674865/xxgkml_674869/ysxxl_674871/	$735.522	6,993,232,900	$1,024.360
		Five-year average:	**$822.44**		**$991.73**
Source of all the figures are from MFA official website (in Chinese). Download their budget excel files of the pertinent years					
all US$ conversion done through https://www.oanda.com/currency/converter/ , using 1 Jan of the year in question for the historical exchange rates.					
GDP, current US$(2015)	**in Trillion $**				
2013	9.607	**MFA budget as % of Gross GDP**			
2012	8.561				
2011	7.573				
2010	6.101				
2009	5.11				
Five-year average	**7.3904**				
	in million $	**Gross MFA budget as percentage of GDP**	**Gross MFA +mofcom budget as % of GDP**		
	7390400	**0.013**	**0.015**		
World Bank source: http://data.worldbank.org/indicator/NY.GDP.MKTP.CD?locations=CN					
accessed 2 January 2017					
	Budget of MofCOM External Organizations only in RMB (驻外机构)	Source	Budget of MofCOM External Organizations only in million US$		
2013	946,963,000	http://www.mofcom.gov.cn/article/cwgongzuo/feiyqr/201407/20140700663702.shtml	149.623		
2012	947,422,000	http://www.mofcom.gov.cn/article/cwgongzuo/feiyqr/201307/20130700203759.shtml	149.695		
2011	860,351,000	http://www.mofcom.gov.cn/article/cwgongzuo/feiyqr/201207/20120708240589.shtml	130.534		
2010	721,704,800	http://www.mofcom.gov.cn/article/cwgongzuo/feiyqr/201108/20110807703120.shtml	105.715		
			$133.892		
		5 or 4 -yr average of MFA + MCOM budget relavent to oil diplomacy:	**$1,125.62**		
All the sources are from official Ministry of Commerce website. There is an overall category of foreign affairs expenses with three sub-categories in the budget.					
I am only counting this sub-category which is the biggest and exclude things like foreign aid and international organization donation and others					
Year 2009 information not available on website					

Table A15 China's Official Diplomatic Spending 2009 to 2013

Appendix D
Oil Supply Securitisation Score Tally

Table A16 below shows distribution of scores of various terms used in the annual reports to securitise oil supply by all the oil companies content analysis have been conducted.

	strategic	security	Total	self-reliance/ self-developed	poor etc.	serve etc.	Domestic Total (without "reliance")	Domestic Total (with "reliance")	Grand Total
PTT 2013	0	33	33	3	0	2	2	5	38
PTT 2012	0	30	30	9	0	1	1	10	40
PTT 2011	0	30	30	4	2	10	12	16	46
PTT 2010	0	20	20	3	0	2	2	5	25
PTT 2009	0	17	17	3	2	3	5	8	25
Thailand NOC grand total	0	130	130	22	4	18	22	44	174
Thailand NOC 5-yr average	0	26	26	4.4	0.8	3.6	4.4	8.8	34.8
CPC 2013	2	3	5	6	3	3	6	12	17
CPC 2012	2	2	4	10	5	6	11	21	25
CPC 2011	2	2	4	8	4	7	11	19	23
CPC2010	2	2	4	8	6	4	10	18	22
CPC2009	2	2	4	12	7	4	11	23	27
Taiwan NOC grand total	10	11	21	44	25	24	49	93	114
Taiwan NOC 5-yr average	2	2.2	4.2	8.8	5	4.8	9.8	18.6	22.8
ONGC 2013-14	6	7	13	0	9	0	9	9	22
ONGC 2012-13	1	5	6	0	2	0	2	2	8
ONGC 2010-11	0	0	0	4	0	0	0	4	4
ONGC 2008-09	3	1	4	0	0	0	0	0	4
ONGC 2007-08	4	8	12	1	2	0	2	3	15
ONGC grand total	14	21	35	5	13	0	13	18	53
ONGC 5-yr average	2.8	4.2	7	1	2.6	0	2.6	3.6	10.6
IndianOil 2013-14	0	7	7	2	30	4	34	36	43
IndianOil 2012-13	0	2	2	2	14	3	17	19	21
IndianOil 2011-12	0	1	1	2	18	2	20	22	23
IndianOil 2010-11	0	4	4	2	17	2	19	21	25
IndianOil 2009-10	0	2	2	2	13	4	17	19	21
IndianOil grand total	0	16	16	10	92	15	107	117	133
IndianOil 5-yr average	0	3.2	3.2	2	18.4	3	21.4	23.4	26.6
India Grand Total	14	37	51	15	105	15	120	135	186
India five-yr average	2.8	7.4	10.2	3	21	3	24	27	37.2
Reliance 2013-14	0	10	10	0	23	2	25	25	35
Reliance 2012-13	0	7	7	2	15	1	16	18	25
Reliance 2009-10	0	9	9	0	11	0	11	11	20
Reliance Grand Total	0	26	26	2	49	3	52	54	80
Reliance 3-yr average	0	8.67	8.67	0.67	16.33	1.00	17.33	18.00	26.67
Sinopec Group 2013 Chinese	4	0	4	0	9	4		13	17
Sinopec Group 2012 Chinese	11	0	11	0	9	8		17	28
2-yrSinopec Chinese AR average	7.50	0.00	7.50	0.00	9.00	6.00		15.00	22.5
Sinopec Corp. 2013	4	0	4	0	0	0		0	4
Sinopec Corp. 2012	2	0	2	0	0	0		0	2
Sinopec Corp. 2011	5	0	5	0	0	0		0	5
Sinopec Corp. 2010	1	0	1	0	0	0		0	1
Sinopec Corp. 2009	1	0	1	0	0	0		0	1
5-yr Sinopec English AR average	3	0	3	0	0	0		0	2.6

	strategic	security	total	self-reliance/ self-developed	poor etc.	serve	domestic total w/o reliance	domestic total w reliance	grand total
CNPC 2012 Chinese	3	1	4	0	0	0		0	**4**
CNPC 2011 Chinese	2	2	4	0	0	0		0	**4**
2-yr Chinese CNPC AR average	2.50	1.50	4.00	0.00	0.00	0.00		0.00	**4.00**
PetroChina 2013	2	0	2	0	0	0		0	**2**
PetroChina 2012	11	0	11	0	0	0		0	**11**
PetroChina 2011	4	0	4	0	0	0		0	**4**
PetroChina 2010	10	0	10	0	0	0		0	**10**
PetroChina 2009	7	0	7	0	0	0		0	**7**
5-yr PetroChina English AR average	6	0.00	6.33	0.00	0.00	0.00		0.00	**6.80**
CNOOC Ltd. 2013	3	0	3	0	0	0		0	**3**
CNOOC Ltd. 2012	4	0	4	0	0	0		0	**4**
CNOOC Ltd. 2011	3	0	3	0	1	0		1	**4**
CNOOC Ltd. 2010	1	0	1	0	1	0		1	**2**
CNOOC Ltd. 2009	0	0	0	0	1	0		1	**1**
5-yr CNOOC average	**2.20**	**0.00**	**2.20**	**0.00**	**0.40**	**0.00**		**0.40**	**2.80**
CNOOC Group 2013 Chinese	6	2	8	0	5	0		5	**13**
CNOOC Group 2012 Chinese	7	4	11	0	5	2		7	**18**
2yr Chinese CNOOC Group AR average	6.50	3.00	9.50	0.00	5.00	1.00		6.00	**15.50**
5-yr Chinese NOC En AR average	**3.71**	**0.00**	**3.71**	**0.00**	**0.13**	**0.00**		**0.13**	**4.07**
2-yr Chinese NOC CH AR average	**5.50**	**1.50**	**7.00**	**0.00**	**4.67**	**2.33**	**0.00**	**7.00**	**14.00**
Exxon Mobile 2013 Form 10-K	0	0		0	0	0			**0**
Exxon Mobile 2010 summary	0	0		0	0	0			**0**
Exxon Mobile 2009 summary	0	0		0	0	0			**0**
Exxon Mobile 3 yr average	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**

Table A16 Securitising score tally of oil companies

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